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"GROWTH" AND THE DIABETOGENIC ACTION OF ANTERIOR PITUITARY PREPARATIONS

II. GROWTH AND EXPERIMENTAL INSULIN-INSENSITIVE DIABETES

BY

F. G. YOUNG, D.Sc., Ph.D.

(From the National Institute for Medical Research, London, and St. Thomas's Hospital Medical School)

In the previous paper in this series (Young, 1941) it was shown that, when treated daily with a dose of crude anterior pituitary extract greatly in excess of that required to produce diabetes in adult dogs, puppies respond with an increase in growth rate and fail to exhibit any symptoms of diabetes. It was then reported that when one puppy had been treated daily for nearly five months he ultimately became intensely diabetic, and then stopped growing despite continuation of pituitary treatment.

The present paper describes investigations into the relationship between growth and the diabetic condition of this and other similar animals.

Methods

Animals.—Normal adult dogs, normal puppies, and adult dogs which had been rendered permanently diabetic by a short period of treatment with anterior pituitary extract (Young, 1937) were used. They were weighed daily and the urine excreted over 24-hour periods collected. Their diet was meat and vitamin concentrates, and, unless otherwise indicated, they were allowed to eat *ad libitum*, the amount of food consumed being determined daily.

Anterior Pituitary Extract.—This was the Seitz-filtered crude alkaline extract of fresh ox anterior pituitary lobe previously described (Young, 1941). The concentration was such that 1 ml. contained the material extracted from 250 mg. of fresh anterior lobe tissue. It was injected subcutaneously.

Estimations.—Urinary sugar was determined by Benedict's method, and urinary ketones by the method of van Slyke. The nitrogen contents of food, urine, and faeces were all estimated by the Kjeldahl method. Blood sugar was determined by the method of Hagedorn and Jensen.

Insulin Sensitivity.—The available carbohydrate of the food consumed was computed from the formula $G+0.58P+0.1F$, where G = preformed carbohydrate, P = protein, and F = fat content of the diet. The figure for the daily intake of available carbohydrate minus the amount of glucose excreted in the corresponding 24-hour period gave the amount of carbohydrate utilized. When the diabetic condition of the animals had been controlled, or almost controlled, by the daily subcutaneous administration of insulin, the available carbohydrate utilized was divided by the dosage of insulin given. In our experiments this quotient (g. of available carbohydrate utilized per unit of insulin administered) has not differed significantly if two doses of ordinary insulin are given with two separate meals, or one dose of P.Z.I. administered and the animals allowed to consume the food over the whole 24-hour period. We have taken this quotient as an index of the insulin sensitivity of the diabetic animal (cf. Falta, 1936), and, although it may vary from animal to animal, it is usually substantially constant from time to time in any given diabetic dog (cf. Marks and Young, 1939).

Results of Prolonged Treatment of Puppies with Diabetogenic Extract

Five puppies were treated daily with the crude extract for a period of 100 days or more, and in every case they grew about twice as fast as control animals. Dogs 124 and 126 received a brief period of treatment with doses of extract which rose from 5 ml. to 20 ml./day during the first four weeks of the experiment and then fell to and remained at 5 ml./day. The other animals received 5 ml./day throughout the experiment. A brief summary of the history of these animals is as follows:

Dog 124 (male black-and-tan terrier; initial weight 2.44 kg.) became diabetic after 131 days of treatment (weight 20.20 kg.), but the diabetic condition disappeared shortly after pituitary treatment ceased. Details of this animal's history are given later in this paper.

Dog 125 (male cross-spaniel; initial weight 1.73 kg.) became diabetic after 239 days of treatment (weight 13.40 kg.), and the diabetic condition persisted after pituitary treatment ceased.

Dog 126 (female fox-terrier; initial weight 3.71 kg.) developed an enlarged thyroid gland after about 80 days of treatment (weight 14.15 kg.). The enlargement persisted until the animal was killed, without having developed diabetes, after 329 days of treatment (weight 29.10 kg.).

Dog 134 (male black-and-tan terrier; initial weight 1.87 kg.) became mildly diabetic after 126 days of treatment (weight 15.40 kg.), but continued to grow for a time, and then became sugar-free again for a brief period. But a return of glycosuria, with a rise to nearly 50 g./day on day 157 (weight 19.70 kg.), led to cessation of growth, and the animal was killed on day 166, daily injections of extract being still in progress (weight 19.30 kg.).

Dog 137 (female black-and-tan terrier; initial weight 2.34 kg.) died in her sleep from no obvious cause after 119 days of treatment; a diabetic condition had not then developed. When she died this animal weighed 15.80 kg. at a time when her litter-mate control male weighed 8.85 kg.

Thus it will be seen that of the four dogs surviving 150 days of treatment three ultimately became diabetic, the date of appearance of diabetic symptoms varying between 126 and 239 days. The puppies were all 2 to 3 months of age at the beginning of the experiment, and by the time they had become responsive to the diabetogenic action of that dose of pituitary extract which initially exerted a growth-promoting and not a diabetogenic action they were 6 months of age or more—i.e., they had become dogs rather than puppies. All three animals which became diabetic ceased growing after severe diabetes had developed; but dog 126, which developed an enlarged thyroid gland early in the experiment and did not become diabetic even after pituitary treatment lasting nearly 11 months, continued to grow throughout the experiment. Although the goitre subsided somewhat towards the end, at post-mortem examination the thyroid gland was found to be 10 to 20 times the size of that for a normal dog of similar weight, and it is

probable that this dog persistently suffered some degree of thyroid deficiency after the goitre had developed. It is possibly relevant that thyroidectomy diminishes somewhat the intensity of pancreatic diabetes (Dohan and Lukens, 1938), and of the diabetogenic action of anterior pituitary extract in the hypophysectomized-depancreatized toad (Houssay, Biasotti, and Rietti, 1934).

Histology of the Pancreatic Islets in the Long-treated Puppies

Dr. H. Hughes, of the Department of Anatomy, St. Thomas's Hospital Medical School, kindly examined histologically the pancreatic material from these animals, and his report will be published in full elsewhere. With his permission the following summary of his findings is given.

Dog 124.—Pancreas not grossly abnormal, though many β cells contained only a few specific cytoplasmic granules.

Dog 125.—Gross destruction of β cells, with some reduction in the number of α cells. Vacuolation of duct epithelium marked (cf. Richardson, 1940).

Dog 126.—Substantial increase in the number of β cells, some islets consisting solely of such cells. No vacuolation of duct epithelium observed.

Dog 134.—Intense hydropsis of β cells observed, with apparent increase in number of islets and total amount of islet tissue. The number of α cells was possibly abnormally low.

The histological findings are in general agreement with the metabolic observations.

Influence on Growth of Simultaneous Treatment with Diabetogenic Pituitary Extract and Insulin

The results of the above long-term experiments clearly supported the conclusion drawn in the previous paper that "an increase in body weight . . . can be regarded as neutralizing, for a time at least, the diabetogenic influence of the anterior pituitary gland" (Young, 1941). An interesting possibility now arose with respect to the grown "puppy" that had become responsive to the diabetogenic influence of pituitary treatment, and had then ceased to grow despite continuation of the same treatment as had initially stimulated growth without precipitating diabetes. Would such an animal grow if pituitary treatment were accompanied by the administration of sufficient insulin to suppress, or at least depress, the diabetogenic effect of the pituitary extract? Experiments were therefore carried out on these lines.

Dog 124.—Although sugar first appeared in the urine of this animal on the 131st day of the experiment, the rate of growth under the influence of pituitary treatment alone was initially unaltered, remaining at about twice that of control animals (Fig. 1). But when the glycosuria exceeded 30 g./day growth stopped, both body weight and glycosuria then remaining approximately constant for a period

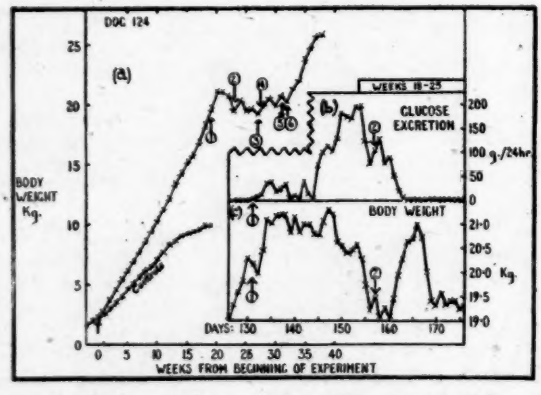

FIG. 1.—Data relating to dog 124, treated daily with diabetogenic pituitary extract. (*a*) Growth curve for whole experiment. The data plotted are the mean weights for periods of one week. The control curve is based on data for four untreated animals of the same breed as dog 124. (*b*) Sugar excretion over weeks 18–25. (*c*) Daily variations in weight over weeks 18–25.

The points indicated by the arrows are as follows:—1: Excretion of sugar first observed. 2: Daily injection of pituitary extract stopped. 3: Daily injection of extract resumed. 4: Daily injection of extract again stopped. 5: Single injection of extract given. 6: Daily injection of pituitary extract and insulin given from this point onwards.

of about 2 weeks. Thereafter the rate of excretion of sugar rapidly rose to about 200 g./day, and the body weight simultaneously began to fall. Cessation of pituitary treatment on day 156 was quickly followed by disappearance of glycosuria, while the body weight remained substantially constant, though subject to some fluctuation. These results illustrate well the reciprocity between the growth-promoting and diabetogenic actions of the crude pituitary extract (Fig. 1). Subsequently, daily pituitary treatment was resumed for a short period (days 188–193), and although the body weight showed an inclination to rise in response to this stimulus, glycosuria, accompanied by an alarming ketonuria, appeared (Fig. 2). On day 210 a single injection of extract induced a slight but definite excretion of

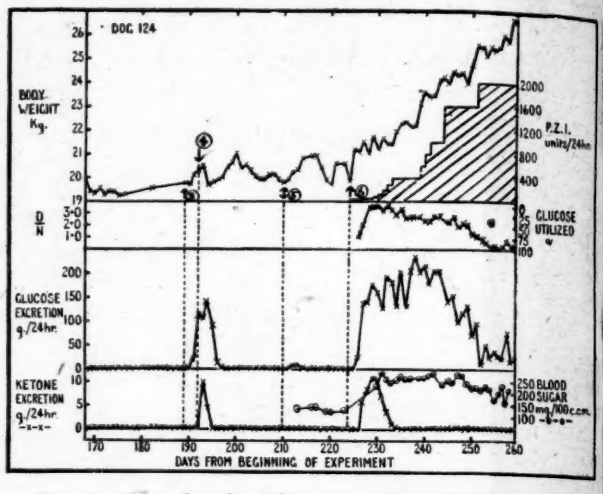

FIG. 2.—Data for dog 124 over period 24–37 weeks. The points indicated by the arrows are:—3: Daily injection of pituitary extract reinstituted. 4: Daily injection of extract stopped. 5: Single injection of extract given. 6: Daily injection of pituitary extract and insulin given from this point onwards.

sugar, which suggested that the animal was in a pre-diabetic condition. On day 224 the daily administration of 5 ml. of the pituitary extract was again begun, protamine-zinc-insulin now being simultaneously injected to control the diabetes thus induced. The initial daily dose of insulin was 20 units, but a dangerous degree of ketonuria developed, the daily excretion of ketone (equivalent acetone) rising above 10 g. despite rapid elevation of the daily dose of insulin to 120 units (Fig. 2). Ketonuria was almost entirely suppressed by raising the insulin dosage to 400 units/day, but even 2,000 units a day did not completely control the glycosuria (Fig. 2). Nevertheless, as the result of this simultaneous treatment with pituitary extract and insulin, the dog rose in body weight by nearly 7 kg. (Fig. 2 and Table I). It should be pointed out that the amount of food eaten by this animal was not controlled, and that he ate more as the result of the treatment with pituitary extract and insulin (Table I). During the last few weeks of the experiment samples of blood plasma from this dog were tested for anti-insulin activity in the rabbit (de Wesselow and Griffiths, 1936), with negative results.

Dog 125.—Unlike dog 124, this animal became persistently diabetic as the result of prolonged treatment (239 days) with pituitary extract alone. An experiment similar to that carried out on dog 124 was then performed on this animal, with the main difference that the food intake was controlled and fixed at 894 kg. cal./day throughout the experiment and that the animal received a small daily dose of insulin before pituitary treatment began (Table I). This animal also increased in body weight as the result of simultaneous treatment with insulin and pituitary extract, the mean daily dose of insulin required to control the diabetic condition during pituitary treatment being 330 units, compared with 20 units/day for the period without simultaneous pituitary treatment. This experiment showed that the insulin sensitivity of the diabetes induced by the pituitary treatment was still low even when the food intake was restricted to a constant level, and, furthermore, that the growth-promoting action of simultaneous treatment with pituitary extract and insulin could be demonstrated under such conditions.

Dogs 115 and 132.—These were two adult (female and male respectively) dogs which had been rendered permanently diabetic by a short course of pituitary extract. Dog 115 had been diabetic for nearly 2½ years, and dog 132 for nearly 1 year, when the experiments described here were carried out. Both animals were apparently adult at this time. Two experiments involving the simultaneous administration of insulin and pituitary extract were carried out with dog 132; in one of these the animal was allowed

to eat 50% more food during the period of simultaneous treatment with pituitary extract and insulin (Table I), while in the other the food consumed was constant throughout. In the single experiment with dog 115 the food intake was constant (Table I). The three experiments on these two animals confirmed the relevant results obtained with dogs 124 and 125—namely, that when the diabetic dogs were treated with pituitary extract and insulin simultaneously they increased in body weight, but that the amount of insulin required to control the diabetes during the period of pituitary treatment was very large compared with that required in the absence of pituitary treatment (Table I).

TABLE I.—*The Influence in the Diabetic Dog of Simultaneous Treatment with Insulin and Anterior Pituitary Extract*

Dog		Control Period							Experimental Period (5 ml. of Pituitary Extract Injected Daily)							
No.	Condition	Duration (days)	Energy Intake (kg. cal./ day)	Energy Utilized (kg. cal./ day)	Energy Utilized (kg. cal./ sq. m./ day)*	Insulin Administered (units/ day)	Available Carbohydrate Utilized (g./unit of Insulin)	Increase in Body Weight (g./kg./ day)	Duration (days)	Energy Intake (kg. cal./ day)	Energy Utilized (kg. cal./ day)	Energy Utilized (kg. cal./ sq. m./ day)*	Insulin Administered (units/ day)	Available Carbohydrate Utilized (g./unit of Insulin)	Increase in Body Weight (g./kg./ day)	Net Increase in Body Weight (Experimental Minus Control) (g./kg./ day)
124	Pre-diabetic	21	1,061	1,061	1,260	0	—	0·0	26	2,157	1,680	1,798	400–2,000	0·12	8·6	8·6
132	Diabetic	12	823	740	1,245	25	2·88	0·0	7	1,235	1,059	1,690	285	0·33	21·7	21·7
125	,,	7	894	894	1,440	20	5·30	0·0	11	894	894	1,365	330	0·30	5·5	5·5
132	,,	16	823	762	1,291	30	2·58	1·0	8	823	670	1,105	280	0·20	7·0	6·0
115	,,	12	526	465	963	8·5	5·24	−4·2	4	526	420	865	170	0·19	5·6	9·8

* Body surface in square metres calculated from the formula $0{\cdot}112\sqrt[3]{W^2}$ (Lusk, 1928), where W = body weight in kg.

It should be mentioned that insulin sensitivity was not, in most instances, constant throughout the experimental period. It fell rapidly after 2 to 3 days of pituitary treatment, and then tended to rise again after 6 to 10 days (cf. Haist *et al.*, 1940). The data given in Table I are the mean values for the stated periods.

Discussion

Growth during Pituitary Treatment.—There is much evidence, direct and indirect, to support the view that pituitary-stimulated growth (together with the accompanying nitrogen retention) is dependent on an increased capacity of the pancreatic islets to secrete insulin. The intact rat does not become diabetic when treated with a pituitary extract which is highly diabetogenic in the adult dog (Young, 1938), and the amounts of islet tissue and of insulin in the pancreas of the rat are both doubled by such treatment (Richardson and Young, 1937; Marks and Young, 1940). Conversely, Marx *et al.* (1943) have recently found that treatment of partially depancreatized rats with a highly purified preparation of growth hormone increases the glycosuria of these animals. Growth is normally accompanied by nitrogen retention, and Mirsky (1939) has presented evidence that the nitrogen-retaining action of anterior pituitary extracts is mediated, at least in part, by the islets of Langerhans of the pancreas, while Gaebler and Robinson (1942) believe that whether or not an anterior pituitary preparation will cause nitrogen storage or exert a diabetogenic effect may depend on the amount of insulin that the pancreas can supply.

In the present experiments it has been shown that during the period of natural growth in the puppy the administration of a pituitary extract which is diabetogenic in the adult animal leads not to diabetes but to an acceleration of growth. When, however, the puppy has reached adulthood under continuous pituitary treatment it may become diabetic and ultimately cease to grow. The treatment of such a diabetic animal, or even of a normal adult diabetic dog, with anterior pituitary extract together with insulin leads again to an increase in body weight, although the daily dose of insulin required to restrain the diabetogenic action of the anterior pituitary extract under these conditions may be very large. For instance, dog 124 required more than 2,000 units/day of P.Z.I. to suppress the diabetogenic action of the daily subcutaneous injection of 5 ml. of the pituitary extract, a dose of extract which during the first 20 weeks of the experiment induced growth uncomplicated by diabetes. It would be unsafe to deduce that during the period of pituitary-stimulated growth the pancreas of the puppy was secreting each day an amount of insulin equivalent in effect to the daily subcutaneous injection of 2,000 units of P.Z.I. It is common experience that rats partially depancreatized at an early age often grow normally without exhibiting glycosuria until they have attained a weight of 200 g. or more, after which they may begin to excrete sugar (cf. Foglia, 1944). In his classical studies on the partially depancreatized puppy Langfeldt (1920) found that an operated animal might be free from symptoms of diabetes mellitus for many months, although ultimately, when the animal had grown, the sugar tolerance might decline and a progressive and ultimately fatal diabetes become manifest. The maintenance of normal growth may require less insulin than might otherwise be expected. Nevertheless it seems probable, on the evidence available, that during the period of pituitary-stimulated growth the pancreatic islets of our puppies were secreting more insulin than would have been required for normal growth in the absence of the extra pituitary stimulus. Certainly, once the endogenous insulin supply of our animals proved to be insufficient for further growth the amount of exogenous insulin required for the maintenance of the growth-promoting action of the anterior-pituitary extract was large (Table I). But there is no evidence that at the point when insufficiency of the endogenous insulin supply became manifest the insulin requirement for the control of carbohydrate metabolism remained unchanged; indeed, the requirement may have risen substantially.

It has been assumed in the present paper that the increase in body weight which occurred under the influence of pituitary extract and insulin was indeed representative of true growth. A study of the nitrogen retention during the period of alleged growth and of the composition of the tissues of the enlarged animal will be reported in detail elsewhere, but it may here be stated that the increase in body weight represents, to a large degree, a rise in the amount of protein containing tissue in the animal (Young, 1945). These results serve to emphasize once again the possible significance with respect to clinical diabetes mellitus of the relationship between the growth-stimulating and diabetogenic actions of anterior pituitary secretions.

TABLE II.—*Insulin Sensitivity in Different Types of Insulin-controlled Experimental Diabetes in the Dog*

Condition	No. of Animals	No. of Observations*	Insulin Sensitivity* (g. of Available Carbohydrate Utilized per Unit of Administered Insulin) Maximum	Minimum	Mean	Standard Error of Mean	
Diabetes following pancreatectomy	8	20	6·30	1·79	3·73	0·277	t = 2·98 (Significant difference)
Persistent pituitary diabetes	5	13	5·30	1·71	2·60	0·258	t = 9·13 (Highly significant difference)
Persistent pituitary diabetes treated with pituitary extract and insulin	4	5	0·33	0·12	0·23	0·038	

* Each observation is the mean value for a series of daily estimations, over periods of 1 to 4 weeks, at a time when the diabetic condition was under control, or nearly under control, as the result of the administration of insulin.

Insulin-insensitive Diabetes.—The diabetic condition exhibited by our pre-diabetic or pituitary-diabetic animals which are treated daily with diabetogenic anterior pituitary extract is clearly of an insulin-insensitive type. In Table II is given a

summary of the data for insulin sensitivity (grammes of available carbohydrate utilized per unit of insulin administered) for the three types of experimental diabetes we have studied. It will be seen that the previously claimed difference in insulin requirement between the depancreatized and the pituitary-diabetic dog (Marks and Young, 1939) is endorsed, and the very low insulin sensitivity of the diabetic animals, treated with both pituitary extract and insulin, emphasized. Statistical analysis shows that the differences between the insulin sensitivities of the three groups are all significant.

For many years Falta and his pupils have emphasized the differences in insulin sensitivity that are encountered in clinical diabetes mellitus. Falta (1936) divides clinical diabetes into three main classes according to insulin sensitivity: those which are insulin-sensitive and retain 2–3 g. of available carbohydrate for each unit of administered insulin; those of the middle class of insulin sensitivity, who retain 1–2 g./unit; and those whom Falta describes as insulin-resistant and who retain only about 0.1 g. of carbohydrate/unit of insulin injected. The insulin sensitivity of the insulin-resistant class of Falta agrees very well with that of our diabetic dogs treated with both pituitary extract and insulin. Dog 124, which required daily more than 80 units/kg. of insulin for (incomplete) control of the diabetic condition (i.e., 5,600 units for a 70-kg. man), appeared to be at least as insensitive to the action of insulin as the human diabetic usually classed as "insulin-resistant." It is therefore of interest that no "anti-insulin" activity of the plasma of this animal was demonstrable in rabbits, although some well-authenticated instances of a "de Wesselow–Griffiths" effect of blood plasma in human insulin-insensitive diabetes have been recorded (Marble, Fernald, and Smith, 1940; Rushton, 1940). But the fact that dog 124 was receiving such large doses of insulin may have complicated the results of this type of test.

Recently Best *et al.* (1942) have examined the effect of simultaneously administering P.Z.I. and diabetogenic pituitary extract to *normal* dogs. Their dose of diabetogenic pituitary extract was probably approximately equivalent to ours, and they found that an average of about 40 units of P.Z.I. was required daily to suppress almost completely the diabetogenic action of the anterior pituitary extract. Calculation on the basis of their published data shows that the carbohydrate equivalent of the exogenous insulin in their experiments was 2.49 ± 0.41 g./unit—i.e., the apparent insulin sensitivity of their animals was similar to that for dogs with ordinary pituitary diabetes. This suggests that a large increase in endogenous insulin secretion may occur in the normal dog treated with diabetogenic anterior pituitary extract, and rough calculation indicates that for a 10-kg. dog it may be equivalent to the effect of the daily subcutaneous injection of about 300 units of P.Z.I. As this is probably 10 to 20 times the normal rate of insulin secretion by the pancreas it is perhaps not surprising that degeneration of the pancreatic islets usually follows treatment with diabetogenic pituitary extract in the dog.

Summary

Daily injection of diabetogenic anterior pituitary extract into puppies induced an acceleration of growth uncomplicated by diabetes, which was maintained during treatment lasting four months or more. At varying times after this period three out of four animals became diabetic, and then ceased to grow despite continuation of pituitary treatment. The animal which did not become diabetic had developed an enlarged thyroid gland early in the experiment; this dog continued to grow in response to pituitary treatment lasting nearly 11 months.

Two of the grown puppies in which the growth-stimulating action of the pituitary extract had given way to a diabetogenic one were induced to resume growth when the administration of the pituitary extract was accompanied by the injection of large doses of insulin. Two adult pituitary-diabetic dogs likewise responded to similar treatment by a rise in body weight.

When diabetic or pre-diabetic adult dogs were treated daily with diabetogenic pituitary extract an extremely insulin-insensitive diabetic condition developed. One dog required as much as 80 units/kg./day of body weight for (incomplete) control of this diabetes.

The possible significance with respect to clinical diabetes mellitus of the relationship between the growth-stimulating and diabetogenic actions of anterior pituitary secretions is once again emphasized.

I am indebted to the Medical Research Council for a grant in aid of that part of the work which was carried out at St. Thomas's Hospital Medical School, and to Dr. J. W. Trevan, Director of the Wellcome Physiological Research Laboratories, for a gift of insulin.

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THE ACTION OF PENICILLIN ON LEPTOSPIRA AND ON LEPTOSPIRAL INFECTIONS IN GUINEA-PIGS

BY

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AND

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The experiments described below were designed to test whether penicillin inhibits the growth of leptospira in culture, and, if so, whether the drug would cure leptospiral infections in guinea-pigs.

In Vitro

Material and Method

Nine strains of *Leptospira icterohaemorrhagiae* were used. Six had been obtained from human infections (Jackson, Hickey, Wijnberg, K.L., Barber, Rachmat); two had been isolated from rats (wild rat and W.P.R.L.); and one from a dog (L 56). The strain of *L. canicola* maintained in the National Collection of Type Cultures was tested also. Some of these strains are virulent for guinea-pigs, and others are completely non-virulent. For the test a solution of penicillin was prepared containing 200 Oxford units per ml., and serial fivefold dilutions were made from it. 0.25-ml. volumes of these dilutions were added to 3 ml. of Fletcher's broth. After mixing, the medium was seeded with 0.25 ml. of a heavy culture of leptospira. The final concentrations of pencillin were thus 50, 10, 2, etc., down to 0.016 Oxford unit in 3.5 ml.

In some later experiments the two highest concentrations were omitted. Most of the tests were carried out with calcium penicillin; in a few parallel experiments crude filtrate of the growth of *Penicillium notatum* in a protein-free medium (Alston, 1944) was used with similar results.

Results

The growth of all these strains was prevented by penicillin in concentrations of 0.4 o.u. and upwards in 3.5 ml. (0.11 o.u. per ml.). With lower concentrations variation of sensitivity to the drug was apparent. Since leptospira multiply more slowly than such bacteria as staphylococci, inhibition of growth compared with controls first becomes noticeable only after about three days' incubation. It was noted that cultures which were inhibited after three days showed no further sign of growth when examined at intervals up to 14 days. Penicillin thus either kills leptospira or maintains its activity against them for one to two weeks at 32° C. It was also found that penicillin cultures, which appeared to be multiplying during the first three days, might show marked diminution in numbers when examined at the end of a week.

This possible lethal, as opposed to inhibitory, effect was examined in another experiment. A well-grown 7-day mass

culture of leptospira was distributed in 9.5-ml. amounts in test-tubes, and 0.5 ml. of serial dilutions of penicillin, diminishing by 50%, were added. The final series contained 240, 120, down to 0.5 o.u. in 10 ml. The mixtures and controls were incubated at 24° C., and were examined at intervals. As before, counts were made of the number of living motile leptospira in standard microscope fields.

It was found that concentrations of less than 15 o.u. of penicillin in 10 ml. had no apparent effect on the leptospira. After 12 days' incubation the number of living leptospira was greatly diminished in higher concentrations, but the organisms were not entirely eliminated after three weeks' contact with penicillin. No abnormal morphological forms were noted such as occur when staphylococci are acted on by penicillin.

This lethal effect of penicillin on leptospira, associated with lysis and destruction, is similar to the action on staphylococci described by Rantz and Kirby (1944).

In Vivo

A series of animal experiments was planned to test: (1) whether infection of guinea-pigs by virulent leptospira could be prevented by the simultaneous administration of penicillin; (2) whether the course of the established disease could be affected by giving the drug once symptoms (fever or jaundice) had become apparent. Before these experiments were carried out Heilman and Herrell (1944) reported that large doses of penicillin, administered at frequent intervals beginning shortly after infection, will protect guinea-pigs against virulent leptospira. The aim of this work differed from our own, so preliminary experiments were undertaken on the lines originally intended.

It was found, however, that guinea-pigs inoculated intraperitoneally with virulent *L. icterohaemorrhagiae*, and given 60 units of calcium penicillin (also intraperitoneally) immediately thereafter and again 48 hours later, died in about the same time as untreated controls. This dosage corresponds to 14,000 units for a man of 70 kg. It was also found that penicillin had no therapeutic effect when treatment was begun after the onset of symptoms—i.e., on the sixth or seventh day after infection. In these experiments guinea-pigs received, in some cases, doses corresponding to 140,000 units for a man of 70 kg. In further experiments the administration of penicillin was started two to four days before symptoms were expected to appear. The results were irregular, and no definite conclusions could be drawn from them.

We finally carried out one experiment in an attempt to confirm the findings of Heilman and Herrell. Fifteen guinea-pigs were inoculated intraperitoneally with a virulent strain of *L. icterohaemorrhagiae*, and treatment with sodium penicillin suspended in an inert oil (arachis oil) was begun 18 hours later in 7 of the animals. Each received 200 o.u. at 10 a.m. and 5 p.m. and 400 units at 10 p.m. The dose was divided —4/5 was injected subcutaneously and 1/5 intraperitoneally. This treatment was continued for 13 days, and on the two following days 400 units were given at 10 a.m. and 5 p.m. Each guinea-pig thus received 12,000 units, corresponding to more than 1,000,000 units for a man of 70 kg.

The result was that 4 of 8 control guinea-pigs and 6 of the 7 treated animals survived. The seventh treated animal showed no signs of leptospiral infection at necropsy, and its tissues were not infective when inoculated into other guinea-pigs. So far as it goes, therefore, this experiment supports the view that penicillin, if given early enough, will reduce the death rate of infected guinea-pigs. In treatment of human beings the use of continuous therapy is a factor which could be expected to increase greatly the efficiency of the treatment and to allow it to be effective in later stages of the infection, by maintaining a steady concentration of the drug in the blood stream. In other ways the experience in guinea-pigs is valuable because human beings and guinea-pigs are very similar to one another in susceptibility to infection by virulent strains of *L. icterohaemorrhagiae* as well as in morbid anatomy of the disease produced.

Serological Tests

It seemed of interest to test the agglutinating titre of the serum, and the resistance to reinfection of those guinea-pigs which had recovered after penicillin treatment, compared with the control animals which had withstood infection. It might be that the treated animals would show less immunity if the drug had reduced their contact with leptospiral antigen. No such tendency was apparent. The sera of 13 animals which had recovered in various experiments with penicillin treatment agglutinated *L. icterohaemorrhagiae* in dilutions of 1 in 30 or 1 in 100. Of 7 control animals, the sera of six gave similar titres while the seventh serum did not agglutinate at all. These agglutination levels are very low as compared with those of convalescent human cases, but we have found previously that guinea-pigs do not produce high titres after either infection or inoculation with leptospiral vaccines. Ten of the animals treated with penicillin were again inoculated with virulent leptospira. None of them showed any sign of infection, while all of four fresh control guinea-pigs died with typical symptoms.

These tests show that penicillin does not prevent the normal development of immunity in this infection.

Toxicity of Penicillin to Guinea-pigs

Heilman and Herrell (1944) found, in confirmation of Hamre *et al.* (1943), that penicillin in large doses is toxic to normal guinea-pigs. The former writers report that "young guinea-pigs receiving from 1,000 to 5,000 units of penicillin daily in divided doses frequently died after several days." Sodium and calcium penicillins from four different sources all produced this effect. Death was preceded by apathy, anorexia, loss of weight, and other signs, but the only obviously abnormal post-mortem finding was dilatation of capillaries throughout the tissues.

Heilman and Herrell believed that some of the infected guinea-pigs which died without the usual signs of leptospirosis were killed by penicillin. This may be so, but in our experience, especially when the course of the disease is unusually rapid, guinea-pigs sometimes die of leptospiral infection without showing either jaundice or haemorrhages, and the infection can be transmitted to other animals.

Rake *et al.* (1944) reached the conclusion that the rapid death of guinea-pigs after large doses of calcium penicillin was attributable to calcium. Solutions of calcium chloride in equivalent amounts were even more toxic. They also found that the toxic effect of sodium penicillin was greater in guinea-pigs than in rabbits or mice. This, however, was observed only after multiple injections, and death was delayed up to six days. The position is not yet clear, because Heilman and Herrell used calcium penicillin, and the toxic effects which they attribute to that drug were of the same kind as those which Rake *et al.* observed with the sodium salt.

The toxicity of the penicillin salt used in the last of our experiments was controlled as follows. Six normal guinea-pigs also received 800 units of sodium penicillin daily for 15 days. No change in weight, appetite, or behaviour was seen. Three weeks later the same animals were given 1,100 units of sodium penicillin twice daily for three and a half days. Again no ill effects were observed. This total dose of almost 20,000 units per animal would correspond to about 5 million units for a man of 70 kg.

Summary

Nine strains of *Leptospira icterohaemorrhagiae* (the causative organism of Weil's disease) and one of *L. canicola* (the cause of another form of leptospiral infection of men and dogs) were found sensitive to penicillin, which has a lethal as well as an inhibitory effect on multiplication.

Penicillin has a curative action on leptospiral infections in guinea-pigs, provided administration is begun very soon after infection.

The curative action of penicillin does not prevent the development, in guinea-pigs, of serum antibodies or resistance to reinfection.

Toxic action of penicillin in guinea-pigs, which has been reported by others, was looked for but was not found.

We are indebted to our technicians, Mr. E. N. Martin and Mr. R. J. Reed, for careful and skilful help in these experiments.

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A CASE OF WEIL'S DISEASE TREATED WITH PENICILLIN

BY

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The following report of a case of Weil's disease which seemed to respond to treatment with penicillin may be of interest.

Case History

On the first day of the illness the patient, an Italian male aged 26, complained of feeling hot and of a pain in the right side of the chest. On the second day a slight cough developed, and he was admitted to hospital on the third day. Examination revealed the following: T. 102°, P. 112; skin hot and dry; a few fine crepitations at both bases; other systems normal. Radiographs showed some opacity at the left base. A tentative diagnosis of pneumonia was made and therapy with sulphamezathine begun.

On the fifth day of the illness the patient's condition was not improved; the fever continued, and the radiologist reported that the films already taken suggested atypical pneumonia. In veiw of this the sulphamezathine was discontinued. On the sixth day the patient became slightly jaundiced; pale stools and bile pigments in the urine were also reported. The liver was slightly enlarged and tender. Conjunctivitis was present. An interpreter elicited that the patient had worked in ditches and canals. A low-fat high-protein high-carbohydrate diet was ordered, with additional vitamins and a saline purge each morning. Precautionary measures were instituted.

On the seventh day the jaundice was more pronounced and the temperature still raised (100.2° F.); the patient was rather drowsy, and for the first time his condition gave rise to some anxiety. By the ninth day his general condition had begun to improve, and by the 20th day the temperature was normal, with the jaundice markedly improved. At no time during the illness did the patient show any haemorrhagic tendency.

The laboratory investigations together with details of penicillin administration are set out chronologically in the accompanying Table.

Day of Illness	White Cell Count	Icteric Index Units	Agglutination of Formolized Culture of *L. icterohaemorrhagiae* (Human Strain) with Patient's Serum	Presence o Leptospira in Alkaline Urine of Patient	Penicillin Administration
6th	Total, 14,000: neutrophils, 13,440 (96%), lymphocytes, 560 (4%)				
7th		55		None seen	
10th	Total, 14,000: neutrophils, 76%, lymphocytes, 19%, eosinophils, 3%	110		" "	
13th			$\frac{1}{10} \pm \frac{1}{30}$ tracé		
16th	Total, 12,000: neutrophils, 78%, lymphocytes, 22%		$\frac{1}{10} + \frac{1}{30} + \frac{1}{100} \pm \frac{1}{300}$ trace		
17th				" "	
18th			$\frac{1}{10} + \frac{1}{30} + \frac{1}{100} + \frac{1}{300} + \frac{1}{1000} + \frac{1}{3000}$ trace	" "	
19th	Total, 10,000: neutrophils, 64%, lymphocytes, 35%	36		" "	
22nd				Numerous organisms of *L. icterohaemorrhagiae* seen	
23rd				Scanty organisms	
28th		24			
29th				Leptospira still present	
30th					Penicillin 15,000 units every 4 hours started at 6 a.m.
31st				Very scanty organisms seen	Penicillin continued
32nd				No organisms seen	" "
33rd					Penicillin discontinued. Total given, 315,000 units
35th	Total 8,000	15		" "	
41st				" "	

Conclusions

Unfortunately this case cannot be regarded as proof that the penicillin was responsible for the disappearance of the organisms from the urine, since they tend to disappear spontaneously in the natural course of the disease, though they may remain present in the urine for as long as 40 days. Indeed, to offer complete proof that penicillin will destroy the leptospira *in vivo* a series of cases will have to be treated, and in view of the comparative rarity of the disease this may take some time. It can, however, be regarded as at least very possible that the penicillin was responsible for the destruction of the organisms in this instance, and, if this be assumed, the following conclusions may be drawn from the case:

1. In view of the small dosage at relatively long intervals it would appear that the organism can be eliminated rapidly and easily, being relatively susceptible, as suggested by experimental work in animals.

2. That the diagnosis must be established at the earliest possible moment, and penicillin administered. From a study of this case it will be seen that recovery had begun before the organisms could be found in the urine. In this connexion the great value of an early increased white cell count with relative and absolute granulocytosis is again deserving of emphasis. It may well prove that in view of the difficulty of establishing the diagnosis completely until relatively late in the disease—save for those cases in which the organisms may be demonstrated in the blood in the early stage by dark-ground illumination (though unfortunately this is not always successful)—a case suspected of being Weil's disease, with a typical white cell count, should have penicillin immediately when ample supplies become available.

3. The penicillin did not appear to hasten recovery in any way, the jaundice diminishing no more rapidly, and remaining until the 42nd day. In a case in which recovery is already taking place spontaneously this might be anticipated, since obviously the damaged liver will take some time to resolve. It suggests, however, that, if spontaneous recovery is already occurring, penicillin may not benefit the course of the disease, its value at this stage being to render the patient free from the risk of infecting others earlier than might otherwise be the case, and in preventing a relapse—sometimes spoken of as "after-fever"—which is said to occur in from 25 to 40% of cases during the convalescent period.

The Bristol Hospitals Fund has issued its fifth annual report. In 1941 the hospitals decided to use the Fund as a collecting agency for all employers' contributions formerly sent to the individual hospitals direct. The Fund's total revenue in 1943 was £56,411, an increase of £8,017 over 1942. In an epilogue the report states: "The failure of the Government in the White Paper on a National Health Service published on Feb. 17, 1944, and its failure in the subsequent Parliamentary debates, to give any certain indication of the retention of the contributory scheme organization in the proposed new National Health Service, or to allay the fears of the voluntary hospitals as to their future chances of survival in a vast bureaucratic structure, is disquieting and calls for deep and earnest thought."

AMOEBIASIS: SOME DIFFICULTIES OF DIAGNOSIS*

BY

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Amoebic Dysentery

Amoebiasis is a disease of military importance and, as an aftermath of the war, may well produce diagnostic pitfalls and surprises. Colonic and rectal tumours, anal and perianal ulceration, recurrent colitis, enigmatic and insidious liver abscess, are among its sequelae. The early diagnosis of amoebic dysentery is not always easy, and, furthermore, no treatment at present known is a guarantee against recurrence. There is evidence that the chance of cure bears an inverse relation to the duration of the symptoms before emetine treatment is started. Even in countries where amoebiasis is common its manifestations are protean, and the disease may exist for long periods before diagnosis is made and treatment begun.

Sigmoidoscopic Appearances.—These are varied and the lesions are often minute and easily missed. In addition to the typical discrete ulcers, which, owing to their usual position on a mound of oedematous mucous membrane, resemble a tiny pouting mouth, other changes are seen in the bowel wall. Briefly these are: scattered discrete petechial haemorrhages with no ulceration; a patch of deep-red inflamed hypertrophic oedematous mucous membrane which may be nodular to the touch; a large solitary irregular indurated ulcer infiltrating the rectal wall; diffuse proctitis with no particular characteristics except that it is usually sharply limited to the rectum.

The association of bacillary with amoebic dysentery has to be remembered. The diffuse inflammation of bacillary dysentery, with or without irregular erosions, or, in the healing stage, large irregular flame-shaped submucous haemorrhages, may overshadow amoebic lesions, which become obvious only when the former is cured. Discrete clean-cut ulcers, identical in appearance with those of amoebiasis, may sometimes be seen in bacillary dysentery. Not infrequently the sigmoidoscopic findings are indefinite and scrapings are negative, so that re-sigmoidoscopy after a course of sulphaguandine and/or emetine may be necessary.

In amoebiasis, dysenteric symptoms may be slight or absent, and amoebae may not be found in the stools on direct examination; in fact, secondary manifestations of the disease may be the first indication of infection.

Six weeks before admission a soldier developed pain in the right lumbar region, was treated, and returned to duty. Three weeks later he had persistent pain in the right chest accompanied with high fever, and was admitted to hospital. Sterile pus was aspirated from the right chest on several occasions; sulphathiazole was given. Three weeks after the first aspiration a total right empyema was treated by rib resection. Six days after the latter operation he had diarrhoea for two days, during which time the stools contained no blood, mucus, amoebae, or cysts. After drainage of the empyema the patient remained ill and febrile. Twenty-two days later (11 weeks after the first symptom) rectal examination revealed an indurated and somewhat hypertrophic ulcer, 2½ in. by 2 in., on the posterior wall of the ampulla—diagnosed as an amoeboma, though repeated stool examination had revealed no amoebae; amoebae were, however, cultured later from the stool. He was put on emetine: discharge from the empyema quickly diminished, and recovery was rapid.

Amoeboma (Amoebic Granuloma)

Medical officers working in the East are fully alive to the occasional development of a tumour of the colon or rectum resulting from amoebiasis. Repeated amoebic invasion of the colon, together with superadded pyogenic infection, may produce a progressive inflammatory lesion leading to tumour formation. The inflammatory process spreads through the bowel wall into the pericolic and perirectal fat and infiltrates surrounding structures. The tumour consists of fibrous tissue, overgrowth of granulation tissue, and varying degrees of ulceration. The wall of the gut is destroyed and small abscesses may be present in the centre of the mass. There is considerable round-cell infiltration; lymphocytes and eosinophils are present in large numbers.

Typical amoebic ulcers may be present or, on the other hand, no evidence of amoebiasis may be forthcoming. It is likely, in the latter case, that the parasite is dwelling comfortably in the depths of the gradually growing tumour.

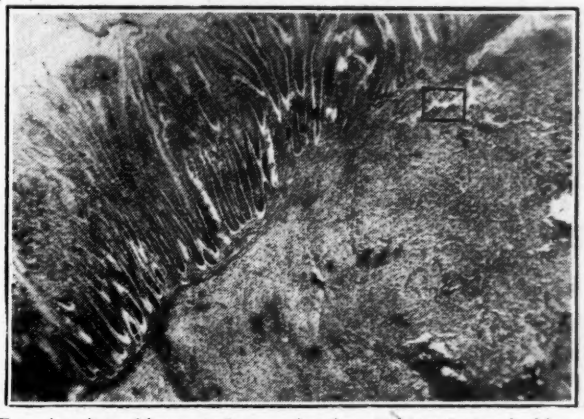


FIG. 1.—Amoebic granuloma, showing *E. histolytica* inside a blood vessel.

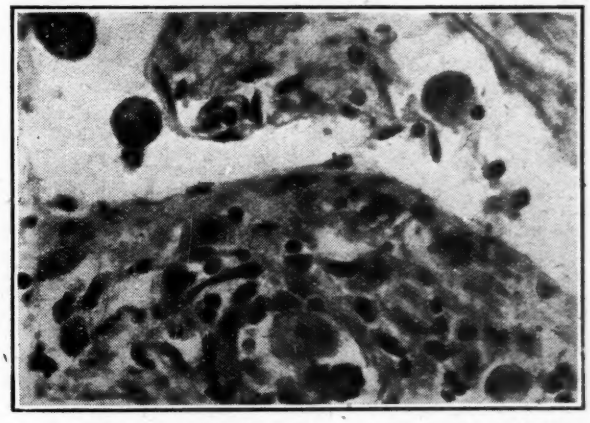


FIG. 2.—Higher magnification of area marked in Fig. 1, showing *E. histolytica* lying in a small vein.

The usual sites for a granuloma are the rectum, recto-sigmoid junction, and caecum. When the mass is situated at the recto-sigmoid junction or in the ampulla of the rectum the patient complains of tenesmus and may pass blood and slime with or without faeces. An amoeboma of the rectum may be submucous and nodular, protruding into the lumen, or may take the form of a deeply indurated ulcer. The surface of the bulk of the tumour is usually smooth, but it may be irregular, friable, and infiltrating. Diagnosis from carcinoma of the rectum is difficult, and often impossible, by digital examination or by sigmoidoscopy. The dark-red nodular and ulcerated lesion looks like a carcinoma. Further, a smooth rounded non-ulcerated mass cannot be distinguished from submucous spread of a carcinoma. Even when amoebae are isolated from the stools the coincidence of a carcinoma cannot be excluded until a biopsy has been made.

A gunner aged 28 had been operated upon 10 months previously for haemorrhoids. 2½ months later he had pain on defaecation and rectal bleeding. On admission to hospital a large craggy mass was felt in the lower rectum, and *Entamoeba histolytica* was found in the stools. Emetine 12 gr. and carbarsone 0.5 g. daily for 7 days had no effect. Transferred to rectal centre: biopsy—carcinoma of the rectum; removed by combined excision.

The symptomatology of amoeboma in the colon and caecum, together with a palpable tumour, the chronicity of the disease, ill-health, loss of weight, and a filling defect demonstrated by barium enema radiograph, make the differential diagnosis from carcinoma difficult. The history of previous amoebic dysentery

* Abridgment of a paper read to the Teheran Medical Association on July 1, 1944.

or the finding of amoebae in the stools will suggest amoebiasis, but it should be remembered that carcinoma and amoeboma may coexist in the colon just as in the rectum.

In the early stages of the tumour formation the whole mass will melt away miraculously after emetine treatment.

A soldier had a history of dysentery 13 months ago; now pain in the anal region and retention of urine. Sigmoidoscopy showed a firm irregular tumour on the posterior rectal wall covered with mucopus. Examination of the stools and mucopus showed no amoebae or cysts. After a course of injections of emetine the tumour totally disappeared within one month.

When the amoebic lesion has been present for a long period, however, the superadded result of chronic secondary infection, fibrosis, and distortion of the colon may prevent the mass disappearing with anti-amoebic treatment. In such cases excision of the tumour may be necessary not only to treat the ill-health, recurrent diarrhoea, and obstructive symptoms, but also because it is impossible to exclude carcinoma.

Squad. Ldr. X., aged 44, had diarrhoea in Mombasa 17 months ago and recurrent attacks since. During the past 6 months he had increasing and recurrent abdominal colic with pain in the right iliac fossa, anorexia, loss of weight, and slight fever. A large tender mass was palpable in the right iliac fossa; w.b.c. 17,000; sigmoidoscopy—amoebic ulcers in rectum; active *E. histolytica* in stools. Given two courses of emetine and one of carbarsone; after each course the mass was much smaller, the patient improved in health, became apyrexial, and was allowed up and about. (Seen by Gp. Capt. C. W. Flemming.) Barium meal and enema showed a large tumour bulging into the caecum and pushing it upwards. The ileo-caecal junction could not be demonstrated with certainty, though it was thought to be above the main mass. The intraluminal projection was quite smooth. Diagnosis: ? amoeboma—unlike a carcinoma. Two months later the mass again became larger and the patient was not so well; he was transferred to the M.E. Rectal Centre. The tumour was thought to be an amoeboma, which as a result of prolonged secondary infection did not subside completely with emetine. Pre-operative blood transfusion, sulphasuxidine, and a few grains of emetine were given.

Operation.—A huge inflamed mass was present in the caecum, attached to the anterior and posterior abdominal walls; many adherent coils of small intestine were separated; one loop formed a fistula with the mass (this was where the *x* rays suggested the ileo-caecal junction); mobilized with difficulty. Ileo-caecal resection—lateral ileo-colic anastomosis—sulphathiazole powder locally—drainage of retroperitoneal tissues—abdomen closed. Emetine 8 gr. was given after operation. Uneventful recovery; secondary anaemia treated with blood transfusion and iron.

Even after its removal and macroscopic examination the tumour was thought to be an amoeboma until examined microscopically.

Pathological Report (Capt. A. W. Morgan, R.A.M.C.).—"Specimen consists of 8 in. of terminal ileum, a caecal tumour, and the ascending colon. The terminal ileum disappears into the tumour and there is a fistula between the ileum and the mass. On section the tumour is pale white, mottled with areas of fat, haemorrhage, and necrosis. The last 2 in. or so of ileum winds through its substance. The tumour has pushed upwards into the lumen of the ascending colon, terminating in a valvular opening (? site of ileo-caecal valve)."

Histology.—Adenocarcinoma, Grade II, with mucoid degeneration. One gland examined was not invaded. No evidence of amoebiasis.

The marked decrease in size of this tumour following the use of emetine, the finding of amoebae in the stools, and amoebic ulceration in the rectum, make it probable that this patient originally had both a carcinoma and an amoeboma, and the latter disease had reacted to the emetine.

Amoebic Typhlitis and Appendicitis

The differential diagnosis between amoebic typhlitis, acute appendicitis, and appendix abscess often presents difficulty, since the most important diagnostic fact—the typical history of acute appendicitis—may not be forthcoming, and, further, obstruction to the lumen of the appendix may result from amoebic infection.

Operation is undesirable in the presence of uncomplicated active amoebiasis of the caecum and appendix: a high mortality rate was reported in the Chicago epidemic. Surgical treatment, however, must not be delayed when the typical history, symptoms, and signs of acute "*obstructive*" appendicitis are encountered within the first 24 to 36 hours, whether or not the patient has amoebic dysentery. If at operation both the caecal wall and the appendix are found to be uniformly inflamed and the case is likely to be dysenteric, it is best not to remove the appendix unless it is obstructed and/or its blood supply is in jeopardy. Further, when there is typhlitis only, a normal appendix should be left. When appendicectomy is necessary in the presence of inflammation of the caecal wall at the appendix base, sulphathiazole or sulphanilamide powder should be sprinkled locally and adequate drainage instituted. Immediate post-operative specific treatment of amoebiasis will prevent local complications, such as skin ulceration or persistent faecal fistula.

When a mass is palpable in the right iliac fossa, though it may be impossible to distinguish between an appendix abscess and amoebiasis, its treatment, however, is the same—namely, observation of the patient and of the mass and a strict Ochsner-Sherren regimen. If indications for surgical intervention arise, treatment should be limited to simple drainage with minimal disturbance of the inflamed mass.

When amoebic infection is proved or suspected emetine should be administered. It may be assumed that a mass resolving spontaneously without emetine treatment is undoubtedly not due to amoebiasis.

Amoebic Ulceration of Anal Skin: Amoebic Fissure in Ano

Painful fissures are sometimes due to amoebiasis of the skin. They are usually multiple, but may be single. The edge of the ulcer is sharply defined and irregular, with undermining or sometimes slight heaping-up. The base has a dirty yellow and unhealthy appearance, with no surrounding induration and little inflammatory reaction, somewhat resembling synergic gangrene of the skin. Cutaneous amoebic ulceration vanishes in a dramatic way soon after the administration of emetine. One case undergoing treatment with carbarsone developed a typical amoebic anal ulcer: emetine produced an immediate improvement.

Operations on the Anal Canal and Rectum in the Presence of Amoebic and Bacillary Infection

The danger of operating upon haemorrhoids, fissure, etc. in a patient with recurrent diarrhoea soon became known. Painful, unhealthy, non-healing ulceration of the anal canal and rectum was seen in cases referred to the Centre for opinion. The cases had active bacillary or amoebic infection, or, when no specific cause could be found, sigmoidoscopy always revealed proctitis of varying degrees. One officer had been in a hospital for 2½ months with ulceration of the anus following haemorrhoidectomy performed soon after an attack of diarrhoea. The appropriate medical treatment and simple local irrigations soon produced a cure.

An instruction was circulated pointing out these dangers, and sigmoidoscopy was carried out before every rectal operation. It is unwise to do even a minor rectal operation within 6 weeks of an attack of diarrhoea, and dysenteric infection must always be excluded before operation.

The accompanying photomicrographs are reproduced by the courtesy of Dr. Habibi, pathologist, the Faculty of Medicine, Iran.

AN INVESTIGATION INTO THE USE OF SULPHASUXIDINE IN OPERATIONS ON THE RECTUM AND COLON

BY

D. H. MACKENZIE, B.A.

It has been shown by previous workers that administration of succinyl sulphathiazole (sulphasuxidine) causes profound changes in the stools of the recipient, the change most relevant to the present discussion being the decrease in the number of Gram-negative organisms. Prior to the work described here in connexion with the surgery of the rectum and colon, some investigations were carried out to study the action upon the intestinal organisms of sulphasuxidine, sulphaguanidine, and sulphathiazole. The technique used was that of Holt and Wright (*J. Path. Bact.*, 1942, **54**, 248). 0.5 g. of faeces was thoroughly mixed with 4.5 c.cm. of nutrient broth, and serial

dilutions were made up to 10^{-6}. One standard loopful of each dilution was plated on to selective media—MacConkey and desoxycholate citrate agar. Colony counts were made after 24 hours at 37° C. Films were examined wet and by Gram's stain.

The Investigation

Thirty cases were examined; eight of these received sulphasuxidine—three 20 g. per day and five 10 g. per day—and eight received 10 g. of sulphaguanidine per day. The remaining fourteen cases received sulphathiazole—six having 2.5 g. and eight having 5 g. per day. It is not intended to record the full colony counts of these earlier experiments or to include clinical details of the diseases and their courses; but an account of the results, which were remarkably consistent, is given.

Colony counts and studies of films showed, in cases receiving 20 g. per day of sulphasuxidine, a universal decrease in Gram-negative organisms. Although the results varied slightly from person to person, there were many occasions when no coliform organisms were grown from the 10^{-2} dilution, and sometimes they disappeared from the 10^{-1} dilution. In cases receiving 10 g. per day the "sterilization" was less consistent and more time was required to effect an adequate reduction in Gram-negative organisms. A dosage of 5 g. per day appears to be ineffective (see Appendix).

With the exception of the abolition of pathogenic non-lactose fermenters, the action of sulphaguanidine did not emulate that of sulphasuxidine upon the intestinal flora. Even after five or six days' treatment there was frequently a confluent growth of coliform organisms when the 10^{-1}, 10^{-2}, and, sometimes, the 10^{-3} dilutions were plated out.

The use of sulphathiazole as a pre-operative treatment has certain obvious disadvantages. It is more likely to cause toxic symptoms than either sulphasuxidine or sulphaguanidine, and is far more likely to give rise to renal complications. However, even with the small doses given in these experiments, there was a greater effect than that obtained with sulphaguanidine. There was a decline in Gram-negative organisms, and with a dose of 5 g. per day it was common for *B. coli* colonies from the 10^{-2} dilution to number less than 20.

No toxic symptoms or complications were observed in any of the cases in this series. Blood concentrations remained low, particularly with sulphasuxidine, figures about 1 mg. per 100 c.cm. being common. Figures for sulphaguanidine seldom exceeded 3 mg. per 100 c.cm., while the smallness of the doses of sulphathiazole kept the absorption low.

Estimations of sulphonamide concentrations in the faeces were carried out in many cases. This is an unsatisfactory estimation, however, because it is difficult to ensure that all the drug has been extracted from the faeces, and concentrations will vary according to the consistency of the stools and the number passed per day.

With sulphasuxidine there is an added difficulty owing to the fact that the drug is being continually broken down into free sulphathiazole. The percentage of this drug which is excreted as sulphathiazole is small, and unless stools are passed very infrequently the breakdown is unlikely to exceed 5%, and is often considerably smaller. With sulphaguanidine the concentration usually lies between 500 and 2,000 mg., while with small doses of sulphathiazole the concentration is usually below 100 mg. per 100 c.cm. These are only approximate figures, and exceptions are common.

The accompanying Appendix demonstrates the effect of various doses of sulphasuxidine. The drug appeared to exercise no effect on the growth of enterococci. Except where otherwise stated, colony counts were made from the 10^{-2} dilution only, by the technique described previously, MacConkey's medium being used in all cases.

Summary

Sulphasuxidine is capable of causing a profound decrease in the Gram-negative organisms of the intestine, as shown by colony counts and by the study of films. It will be noted that a direct swab from the carcinoma showed no Gram-negative organisms.

A dosage of 20 g. per day for four days before operation appears suitable.

The same effect cannot be produced with sulphaguanidine, but can, to some extent, be obtained with sulphathiazole.

APPENDIX

Case	Dose of Sulphasuxidine per Day	Day	Colonies of B. coli	Nature of Specimen
1. G.S.W. colon: Closure of colostomy	10 g.	Before treatment	Confluent growth	
		1st	,,	
		2nd	Semi-confluent	
		3rd	,,	
		4th	,,	
		5th	,,	
2. Carcinoma sigmoid colon: Resection	10 g.	Before treatment	Confluent growth	
		1st	Semi-confluent	
		2nd	3 colonies	
		3rd	39 ,,	
		4th	15 ,,	
3. Recurrent ileitis: Illeo-caecal resection	10 g.	Before treatment	Semi-confluent	
		1st	,,	
		2nd	,,	
		3rd	77 colonies	
		4th	5 ,,	
4. G.S.W. rectum: Closure of colostomy	10 g.	Before treatment	Semi-confluent	
		1st	50 colonies	
		2nd	60 ,,	
		3rd	60 ,,	
		4th	11 ,,	
5. Adenomatosis colon and carcinoma rectum: Combined excision and total colectomy; terminal ileostomy	20 g.	Before treatment	Semi-confluent	
		1st: 8 a.m.	,,	
		,, 9 a.m.	22 colonies	
		,, 3 p.m.	10 ,,	
		,, 8 p.m.	3 ,,	
		2nd: 1	7 ,,	
		,, 2	None	Swab from growth
		3rd	,,	Direct plating from ileostomy
		4th	,,	Scrape from dressing
6. Carcinoma rectum: Combined excision	20 g.	Before treatment	Semi-confluent	
		1st	,,	
		2nd	69 colonies	
		3rd	25 ,,	
		4th	None	
7. Carcinoma rectum: Combined excision	20 g.	Before treatment	Semi-confluent	
		1st	,,	
		2nd	None	
		3rd	3 colonies	
		4th: 1	None	
		,, 2	,,	Swab from growth
		5th	,,	Swab from colostomy
8. Trial	5 g.	Before treatment	Confluent	
		1st	,,	
		2nd	Semi-confluent	
		3rd	Confluent	
		4th	,,	
9. Trial	5 g.	Before treatment	Semi-confluent	
		1st	,,	
		2nd	Confluent	
		3rd	,,	
		4th	,,	
10. Trial	5 g.	Before treatment	Confluent	
		1st	,,	
		2nd	,,	
		3rd	,,	
		4th	Semi-confluent	
11. Trial	5 g.	Before treatment	Confluent	
		1st	Semi-confluent	
		2nd	Confluent	
		3rd	,,	
		4th	,,	

This investigation was prompted by Brig. C. Naunton Morgan, with whose help and co-operation this work was done. Some of the earlier experiments were carried out by Sergt. J. Pilling, R.A.M.C., and Sergt. L. C. Wilson, R.A.M.C. All the laboratory work was done under the direction of Lieut.-Col. R. J. V. Pulvertaft, R.A.M.C., A.D.P., M.E.F.

I wish to thank Col. H. D. F. Brand, late R.A.M.C., commanding (Scottish) General Hospital, and Col. J. S. K. Boyd, late R.A.M.C., D.D.P., M.E.F., under whose general direction the investigations were made.

A. O. John (*Tubercle*, 1944, **25**, 69) records a case of tuberculous endometritis in a woman aged 35, in whom a symptomless pleural effusion caused a suspicion of tuberculosis. Irregular menstrual bleeding followed by curettage led to the tubercle bacillus being discovered in the endometrium. Death took place from tuberculous meningitis.

A SMALLPOX EPIDEMIC

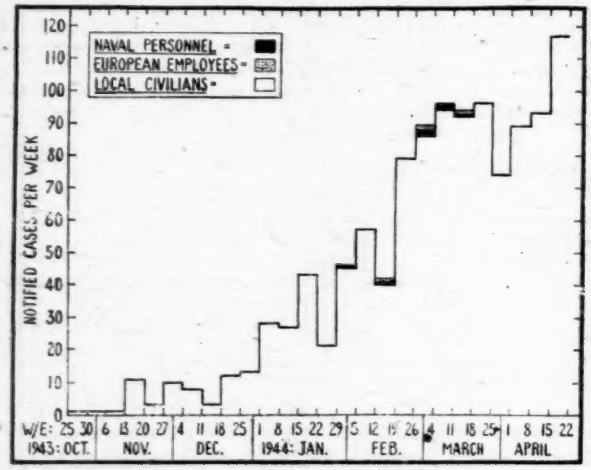
BY

T. St. M. NORRIS, M.B., M.R.C.P., D.P.H.
Surg. Lieut., R.N.V.R.

An epidemic of smallpox occurring among naval personnel and (European) civilian Admiralty employees is here described. The greater severity and length of the primary epidemic occurring among the native population are demonstrated, and its progress would appear to illustrate the very great prognostic value that can be attached to the presence and size of scars of previous successful vaccination.

Description of Outbreak

Smallpox is endemic in the Eastern Mediterranean area. During the winter of 1943–4, from the middle of November onwards, the weekly notifications for civilian cases steadily rose (see Graph). The rise was noted by the naval health



authorities, who in consequence started a campaign advising all naval medical officers to keep their vaccinations up to date.

On Jan. 25, 1944, the first naval case occurred in this area; there were subsequently 7 naval cases in all, with three deaths, and 3 cases among Admiralty (European) civilian employees, with no deaths. The last naval case occurred on March 11.

Naval Cases

Case 1.—Coder. Admitted to the isolation hospital on Jan. 25; had been in an H.M. ship and in a shore base during the incubation period; he gave no history of ever having been vaccinated, and had no scars of successful vaccination. This man developed confluent haemorrhagic smallpox, and died on Feb. 1, seven days after admission to hospital.

Case 2.—A.B. Admitted to the isolation hospital on Feb. 6, 1944. This man had been in a shore establishment. He stated that he had been vaccinated in infancy, but not since. He showed two small scars of successful vaccination. His was a mild case, and he made an uninterrupted recovery.

Case 3.—A.B. Admitted to the isolation hospital on Feb. 23, 1944. He worked in the Dockyard Salvage Unit and was accommodated in a naval hostel. He stated that he had been vaccinated in May, 1942, and showed one very small scar of successful vaccination. This man developed confluent smallpox, was extremely ill, but subsequently recovered, though badly disfigured by facial scars.

Case 4.—A.B. Admitted to the isolation hospital on Feb. 24, 1944. Had been in a large transit camp. He stated that he had been unsuccessfully vaccinated in 1941, but showed neither documentary evidence of this nor any scar of successful vaccination. He developed confluent haemorrhagic smallpox, and died on Feb. 28, five days after admission to hospital.

Case 5.—Leading seaman. This man had been a patient in a general hospital for one month at the time he contracted smallpox. He stated that he had been vaccinated in infancy and again successfully in 1942 and 1943. He showed three small scars of successful vaccination. His was a mild case, and he made an uninterrupted recovery.

Case 6.—Skipper. Admitted to a general hospital on March 1, 1944, and transferred to the isolation hospital on March 2. This man was from a converted fishing trawler, which had been in the base for three weeks before he contracted the disease. He thought that he had been vaccinated in 1943, and according to his pay-book had been vaccinated in 1941. He showed no successful scars. He developed confluent haemorrhagic smallpox and died on March 4, the fourth day after admission to hospital.

Case 7.—Cook. Worked in a W.R.N.S. mess, and lived in private lodgings. Admitted to a general hospital on March 11, 1944, and transferred to the isolation hospital on the 13th. Had been vaccinated in infancy and again in 1942; he showed three good scars of successful vaccination. A very mild case, with an uninterrupted recovery.

Civilian (European) Admiralty Employees

Case 8.—Fitter. Worked in the dockyard. On Jan. 31, 1944, he had been discharged from a general hospital, where he had been in contact with a case which subsequently proved to be smallpox. He was immediately vaccinated. Admitted to the isolation hospital on Feb. 10. He stated that he had previously been vaccinated, and showed one small scar. A very mild case, making an uninterrupted recovery.

Case 9.—Shipwright. Admitted to the isolation hospital on Feb. 25, 1944. He stated that he had been vaccinated in March, 1942, and showed two small vaccination scars. His was a mild case, and he made an uninterrupted recovery.

Case 10.—Shipwright. Admitted to the isolation hospital on March 9, 1944; the second contact case. Stated that he had been vaccinated in 1939 and again in 1944 (after contact). He showed good scars of previous successful vaccination. A fairly severe case, but the patient made an uninterrupted recovery.

Case Occurring in a Corvette

Another case presumed to have been contracted in the area of the base occurred in a corvette. This ship was ten days at sea, outward bound to another port, where a member of the crew was landed suffering from what at first was thought to be measles, but which proved later to be smallpox. The ship's company were all revaccinated, and she returned to base.

On the fourteenth day after landing the patient in the other port, the ship's company were medically inspected. All showed good scars of previous successful vaccination; none contracted the disease, and the ship was taken out of quarantine. This ship carried no medical officer.

Table Summarizing Cases

Case No.	Date of Vaccination	Number and Size of Vaccination Scars	Remarks on Course of Illness
6	1941	None	Died (fourth day)
4	Unknown	,,	,, (fifth day)
1	None	,,	,, (seventh day)
3	1942	1 very small scar	Extremely ill with confluent smallpox; recovered, though scarred
10	1939 and after contact	2 good scars	Fairly severe case; recovered
9	1942	2 small scars	Mild case; recovered
2	Infancy	,, ,, ,,	,, ,,
8	Unknown	1 small scar	Very mild case; recovered
5	Infancy, 1942, 1943	3 small scars	,, ,,
7	Infancy and 1942	3 good scars	,, ,,

Control

This epidemic occurred among personnel whose presence in the base was for the specific purpose of carrying out operations against the enemy. The epidemiological principles applicable to such an epidemic occurring among the civilian population in peacetime had to be modified to suit the situation as it arose. Fortunately it transpired that there was no increase in the incidence or severity of individual cases as a result. The primary consideration was that there should be the minimum interference in the movements of naval personnel on duty and in the operations of H.M. ships. At the same time it was recognized that to achieve this object successfully the epidemic in the Navy must be fully controlled in the minimum of time.

A somewhat bold policy of relying almost solely on vaccination was adopted. The efficacy of this policy was borne out by results, for, so far as is known, no contact of any naval case contracted the disease; though two civilian "European" Admiralty employees may have been infected from the same source or from one another.

In ships and establishments where a case of smallpox occurred the following action was taken: (1) All possible contacts were revaccinated immediately. (2) Direct contacts were paraded for medical inspection daily for 14 days; and their drafting was stopped for this period. (3) The ships and establishments concerned were not put in quarantine nor were

contacts isolated. (4) No drafting of naval personnel, other than direct contacts, was stopped provided they had been vaccinated and showed good scars.

Course of the Epidemic

By March 2 (thirty-six days after the first case had occurred in the Navy) there had been six naval cases; of these, three showed no scars indicative of previous successful vaccination, and a fourth had only a very small scar. It was decided, therefore, that the scheme was not working satisfactorily because all personnel were still not vaccinated, and that more drastic steps must be taken to obtain 100% immunity. Consequently, all leave to and from the base was stopped, and liberty-men were not allowed ashore unless in possession of documentary evidence of vaccination within the past two years.

These restrictions, especially the former, had the desired effect of making all naval personnel, and particularly officers, smallpox-conscious and vaccination-minded. From this date onwards there was a noticeable increase in the numbers presenting themselves for vaccination, and the epidemic in the Navy rapidly subsided. It was possible to raise the ban on leave by March 12.

Conclusions

1. In this epidemic the type of smallpox was virulent, the three fatal cases all ending within a week of admission to hospital.

2. All patients who had no scars of successful vaccination died. Only one patient who showed good scars contracted the disease, and no patient died who did possess any scars, even if very small, of previous successful vaccination.

3. Good scars of previous vaccination were good evidence of immunity in all, or in a very high percentage.

4. In the case of the corvette and the converted fishing trawler—both small ships where contacts must have been close and prolonged—all personnel had been successfully vaccinated and there were no secondary cases. In the latter ship another officer actually shared a cabin with the skipper, who died in four days of confluent smallpox.

5. It was found that issuing advice and instructions alone did not obtain 100% successful vaccination. This was achieved only when restrictions were placed on individual privileges.

6. For some time after the last naval case had occurred the epidemic among the civilian population continued.

Medical Memoranda

Human Infection with Pasteurella septica

Human infection with *Past. septica* is of rare enough occurrence to warrant recording the following case:

CASE REPORT

An African woman aged about 20 was admitted to the Maternity Hospital, Accra, Gold Coast, on Dec. 13, 1938. She was 28 to 30 weeks pregnant and complained of abdominal pain and headache. Temperature 104°; pulse 138; respirations 28. On Dec. 15 she gave birth to a premature infant, which survived only a few minutes. Her temperature did not settle, and a blood culture was made on Dec. 20. On Dec. 28 the left knee-joint was very swollen and a considerable amount of pus was aspirated. The joint was again aspirated on Dec. 30. The patient was discharged from hospital fit on Jan. 14, 1939.

Bacteriology.—From the blood and the two specimens of pus an organism, morphologically and culturally very suggestive of *Past. septica*, was isolated in pure culture. The patient's serum on Dec. 30 agglutinated a suspension of the blood organism to a titre of 1 in 640. White mice injected intraperitoneally with 0.2 ml. of pus from the knee usually died in 12 to 18 hours from septicaemia; one survived 72 hours and showed a fibrinous pericarditis, a sticky peritonitis, and septicaemia.

The cultures were sent to Prof. G. S. Wilson, London School of Hygiene and Tropical Medicine, who, after thorough cultural, serological, cross-immunity, and pathogenicity tests, reported the organism to be a typical strain of *Past. septica*.

Strains of *Past. septica* have been isolated on several occasions in this laboratory from the local wild-rat (*C. gambianus*) population, but this is the only human infection met with so far.

I wish to express my thanks to Prof. G. S. Wilson for the trouble he took over the investigation of the strain, and to Dr. W. M. Howells, O.B.E., Acting Director, Medical Services, Gold Coast, for permission to record this case.

Medical Research Institute, Accra. R. ROBINSON, M.B., Dip.Bact.(Lond.).

Reviews

PHYSICAL METHODS IN PSYCHIATRY

An Introduction to Physical Methods of Treatment in Psychiatry. By William Sargant, M.B., M.R.C.P., D.P.M., and Eliot Slater, M.D., M.R.C.P., D.P.M. (Pp. 171. 8s. 6d., plus 5d. postage.) Edinburgh: E. and S. Livingstone. 1944.

In this well-written book, descriptive of physical methods of treatment in psychiatry, the fundamental thesis is that in a considerable proportion of psychiatric illnesses, and in a sense in all of them, there is a physical substratum. Although this is a presumption, and not, as the authors are careful to explain, a matter of immediate knowledge, none will deny that they have made an excellent presentation of their case. This view goes naturally with an emphasis on constitutional factors as predisposing so largely in the occurrence of abnormal reactions under stress. The authors point out that psychiatrists have unfortunately been divided into two camps: those who are preponderantly interested in the psychological and those who are mainly interested in the physical aspects of mental disease. The authors plead, with evident justification, for a unification of the physical and psychological ways of treatment in psychiatric syndromes, and throughout the book they leave their readers in no doubt as to the need for supporting physical with psychological therapy. Drs. Sargant and Slater have pondered their experience with insight, and their clinical observations are often shrewd and original. Most of their work has been done with neurosis of war, and they are careful to say that the physical methods they advocate for the treatment of neurosis are apt to be less successful with the more complex neurosis of civil life. This unfortunately makes it impossible to be quite so enthusiastic as the authors about some of the methods they describe.

The various techniques—continuous narcosis, prefrontal leucotomy, etc.—are described in detail, and some relevant comments are made—for example, the need to treat epilepsy with more discrimination than is customary, taking into account the environmental circumstances instead of focusing only on the dosage of the drug employed; and they emphasize the usefulness of controlling their administration with electro-encephalograms.

Since the book is likely to have a deservedly large sale it is as well to enter a caveat. The essential ingredient of all treatment is a human outlook. It is not that the book lacks it, but readers less experienced than the authors may be tempted into a very mechanical attitude towards the patient. Nowhere is it more necessary than in psychiatry to think first of all of the patient as a personality, with hopes and fears, rather than as a mechanism to be experimented with.

DOCTOR IN THE MAKING

Doctor in the Making. The Art of Being a Medical Student. By Arthur W. Ham, M.B., and M. D. Salter, Ph.D. (Pp. 120. 9s. 6d.) London: Medical Publications Ltd.

This is an excellent book which should be read by all studying in medical schools and those considering the medical profession as a career. It deals with the motives and mental equipment necessary for the successful medical student. The authors deplore the fact that so many people drift into medicine without the right basic education and ability and for no better motives than "because my father is a doctor" or "because my parents wanted me to be a doctor." There is an excellent section dealing with "the enemies of success," which gives most useful practical advice on how to work, how to improve powers of concentration, how to organize knowledge. The importance of understanding as opposed to memorizing is especially stressed. The chapters on the causes of maladjustment are clear and concise and free from technical terminology. The means for improving adjustment by the change of the ratio between demands and realization are well presented. The need for understanding and applying the scientific method of approach in medicine is emphasized, though the authors remark rather despairingly—perhaps the result of years of teaching medical students?—that "it almost seems that scientific thinking is unnatural to man."

MEDICAL MALPRACTICE

Medical Malpractice. By Louis J. Regan, M.D., LL.B. (Pp. 256. 25s.) London: Henry Kimpton.

This is probably the first monograph of its kind. In this country the subject would not afford the material for more than a longish paper; in America it is so much more important, both in quality and in quantity, that Dr. Regan has had no difficulty in writing a fair-sized though highly condensed text-book. "Malpractice" is a comparative newcomer to the vocabulary of law. It is not strictly a legal entity, for it goes beyond negligence—failure to use proper skill and take proper care—to wrongs which come in quite a different category, such as assault by intervention without consent, and even the betrayal of confidence, invasion of the "right of privacy," and the making of a necropsy without legal authority. These last three wrongs illustrate the difference between the American point of view and our own, for the first is only doubtfully actionable here and the second and third are not at all. The American practitioner has therefore more ways of going wrong than we have, and he seems much more likely than we are to be sued for damages if he strays into any of them. Perhaps American cases are more completely reported than ours; perhaps American patients are more litigious. The fact remains that whereas an English writer would have difficulty in finding two dozen good malpractice cases, Dr. Regan cites several hundreds from the reports of the different States. His method is to state each proposition of law in general terms and then follow it with a number of head notes and extracts of judgments from decided cases in order to throw light on particular aspects of the position. The largest part of the law which he formulates is identical with our own, and so his book will be found not only interesting but practically valuable to British doctors. The reader must, however, be alert for divergencies between the two systems. For instance, eugenic sterilization, Dr. Regan says, is provided by the law of twenty-nine of the States, and some States prohibit non-therapeutic sterilization. The consent of the widow or next-of-kin is necessary before a necropsy can be legally performed except by a coroner or other authorized person, for the wrongful dissection of a dead body is actionable at the suit of the person entitled to the possession and control of the body for burial. Doubtless the conditions which protect a person's right of privacy, and prohibit such infractions of it as the taking of a cinema film of a patient during an operation or the unauthorized publication of likenesses, might well be adopted here. Many States extend privilege from disclosure in evidence to communications made in confidence by a patient to his doctor, and the protection sometimes extends to hospital records in so far as they tend to disclose what physicians have learnt in their attendance on a case, and also to facts known to a nurse through being present and assisting a physician and hearing communications between him and the patient.

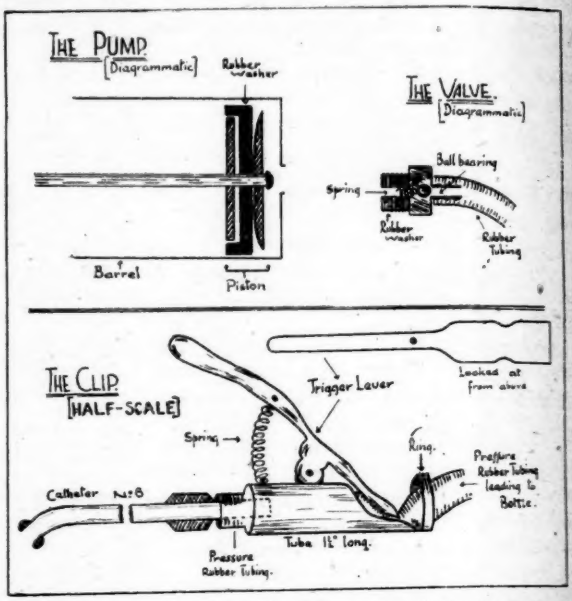
Dr. Regan gives some useful forms of consent to operations and to disclosure of privileged information, and forms of indemnity against the hospital and the attending physician to be signed by a patient who leaves against advice. His self-test for "malpractice vulnerability" is very exacting, and would floor all but one or two exceptional practitioners in this country. How many would get full marks for their answers to the questions whether their records are so kept that they would not be embarrassed by the production of these in court, whether they fully realize their responsibility for the negligence of a partner, an employee, an assistant, an associate, and a substitute, or whether they have some understanding of the doctrine of *res ipsa loquitur*? Nevertheless Dr. Regan regards a good mark as highly necessary for relative safety in "hot-bed" areas. He is caustic about the part frequently played by what he calls the physician instigator—the doctor who cannot refrain from criticizing the conduct of a predecessor. His chapter on prophylaxis makes some exacting recommendations but is well worth studying, especially the advice which he summarizes as "Don't talk so much."

Preparations and Appliances

AN IMPROVISED FIELD SUCTION APPARATUS

Major A. H. SALEH, R.A.M.C., writes:

The need for a simple, improvised, and efficient suction apparatus in the field has always been felt. The appliance supplied to some field units has an old-fashioned foot-pump, which entails much energy to cause a vacuum in a Winchester bottle; furthermore, it requires an orderly wholly employed in pumping. The apparatus described here is a modification of it.



The Pump is an American box-type, as supplied with Dodge and other American trucks. The barrel is opened and the shallow cup-shaped rubber washer is reversed, so that it faces the opposite direction (see diagram). The ball-bearing in the valve connecting the pump to the rubber tubing is displaced to the distal end of the spring (see diagram).

The Suction Head consists of a No. 8 silver catheter to which a bulbous end has been fitted. The other end of the catheter fits into a "negative" clip made to my design by an R.E.M.E. workshop.

The "Clip" consists of (i) a metal tube 1½ in. in length and of a diameter to fit over the narrow pressure tubing used; (ii) a ring to keep the rubber tubing in position; (iii) a trigger lever; (iv) a spring. (See half-scale diagram.)

A Winchester Bottle connected to the pump and the suction head.

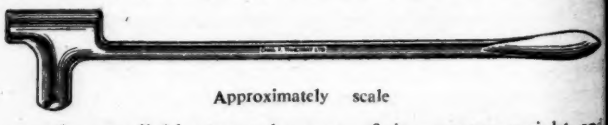
Function.—Two strokes of the pump will cause a vacuum in the bottle. The apparatus is now ready. During the course of an operation, such as a laparotomy, with much blood, etc., in the abdominal cavity, the operator inserts the end of the catheter into the fluid, and with his thumb depresses the trigger lever, when suction instantly comes into play. When the lever is released the tube is kinked and the vacuum in the bottle is conserved for further use. The process can be repeated as long as necessary, with an occasional stroke of the pump to ensure full vacuum.

This apparatus has been in use in a C.C.S. for the last six months and has been found extremely efficient. The vacuum is powerful enough to suck the fluid but not powerful enough to damage any viscera which may get in its way.

TENDON HAMMER

Mr. J. P. CURRIE writes from the Glasgow Royal Infirmary:

The accompanying illustration shows a tendon hammer which I designed some time ago and which has now been produced by Chas. F. Thackray, Ltd., of Leeds. The hammer is entirely of metal and chromium-plated. I have found it more useful than



Approximately scale

any other available types because of its greater weight and better balance. The pointed handle is useful for eliciting the cremasteric, abdominal, and plantar reflexes. The hammer has the obvious advantage of being unbreakable and having no perishable parts.

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ARTIFICIAL INDUCTION OF LACTATION

When Folley and his colleagues at the National Institute for Research in Dairying demonstrated[1] that copious lactation could be produced in virgin goats by inunction of the udders with stilboestrol, wide prospects of practical application were opened up. Any measure likely to increase the milk production of Britain during wartime was obviously of first-class importance, and the Lactation Committee of the Agricultural Research Council authorized large-scale field experiments to be undertaken. Reports of the results of these investigations fill the current issue of the *Journal of Endocrinology*. The papers are long, but fortunately the results can be summarized quite briefly. Hammond and Day[2] from the School of Agriculture at Cambridge agree with Folley and Malpress[3] that plentiful lactation may be induced in maiden or nulliparous heifers or in dry cows by the subcutaneous implantation of tablets of synthetic oestrogens; both papers, however, stress that the response is extremely variable, ranging from *nil* to normal lactation levels. The daily absorption from the tablets was of the order of 5–25 mg. of hexoestrol or stilboestrol, but there appeared to be no correlation between the amount absorbed and the amount of milk yielded. A disadvantage of the treatment was that it caused nymphomanic symptoms, which led to frequent mounting and consequent pelvic fracture in as many as 20% of the animals in some experiments. Folley and Malpress[4] were able to induce lactation in heifers by oral administration of hexoestrol, stilboestrol, or dienoestrol in doses of 20–200 mg. daily, given either in the drinking-water or in food. Only about 10% of these doses are apparently utilized in the body. This treatment did not lead to such pronounced nymphomania, nor were any pelvic fractures sustained, but, on the other hand, the level of lactation was lower than with tablet implantation, just as variable in degree, and again apparently unrelated to dose. Essentially similar results followed the implantation of tablets of 50% hexoestrol, 49% lactose, and 1% stearic acid, which Folley, Stewart, and Young[5] found to be more slowly absorbed than pure hexoestrol tablets. Parkes and Glover[6] were able to cause lactation by single injections of appropriate esters of stilboestrol. The best results were achieved when 250 mg. of a slowly absorbed and of a rapidly absorbed ester such as the dilaurate and dipropionate of stilboestrol were injected together. Folley and Malpress[7] made detailed studies of the composition of the milk they obtained and found it to be initially colostral in type, changing to normal milk as the daily yield increased, so that a daily output of 5 lb. or more was a guarantee of normal composition. Parkes and Glover[8] similarly found the milk to be of normal or high quality. Lawson, Williams, and Stroud[5] analysed samples of the experimental milk from Shinfield and Cambridge for any contained oestrogen. They found the maximum concentration to be 1 μg. per pint, but the average very much less. There can therefore be no doubt that oestrogen treatment is capable of increasing the country's yield of good-quality milk, but unfortunately the variability of response and chances of damage due to nymphomanic symptoms at present make the treatment too uncertain and risky for anything but veterinary trial in isolated cases. The hope that it might be possible to give a routine fillip to milk production during the winter months cannot yet be realized.

The reasons for the extreme variability in response are not clear, and presumably they will not be understood until it is known exactly how oestrogens provoke lactation. The cow is an expensive animal to use for experimental purposes, and only the urgency of war accounts for the precipitate large-scale field trials without preliminary laboratory investigations, even though such investigations may fail to give the desired information, since species differences in mammary physiology add much confusion to the subject. At present the theory generally held is that oestrogen induces udder development directly, and in appropriate doses stimulates the pituitary gland to secrete the hormones necessary to initiate and maintain lactation; if, however, the oestrogen dosage is too high the pituitary may be inhibited instead of stimulated. Failure to induce lactation may therefore be caused either by inadequate oestrogen dosage or by overdosage, and, in fact, instances of both are to be found in these reports—instances where minimal lactation was markedly improved by giving additional oestrogen treatment, and other cases where removal of the implanted oestrogen tablets increased the milk yield. Hammond and Day also point out that failure to initiate lactation is more frequent in cows than in heifers, and they attribute this to the inhibitory action of persisting corpora lutea; if such corpora are removed during the period of oestrogen treatment the milk yield goes up. The authors regard this as analogous to the condition in pregnancy, where persisting corpora lutea prevent lactation despite fully developed mammae. All the authors are agreed that there is a cessation of follicular growth and that the ovaries are quiescent during the period of oestrogen treatment, which must therefore exert an inhibitory action on the secretion of pituitary gonadotrophin. It is apparent that rigorous control of dosage is one of the prerequisites of successful application of these findings to normal dairy-farm practice, and one suspects that tablet implantation is not the method to ensure this. It is noteworthy that Dr. Parkes, in spite of his great part in the discovery and development of the tablet-implantation technique, has here preferred to administer the oestrogens by injection, which, in view of the very large wastage that occurs with oral administration, appears to be the most hopeful line for further investigation.

[1] *J. Physiol.*, 1940, **98**, 15 P.; *J. Dairy Res.*, 1941, **12**, 241.
[2] *J. Endocrinol.*, 1944, **4**, 53.
[3] Ibid, p. 1.
[4] Ibid., p. 23.
[5] Ibid., p. 43.
[6] Ibid., p. 90.
[7] Ibid., p. 37.
[8] *J. Endocrinol.*, 1944, **4**, 83.

DISPERSAL OF OFFICE WORKERS

Since the days of Queen Elizabeth the growth of London has been a problem. With every fresh development of transport it has become more insoluble. Various writers have during the present century emphasized that something ought to be done, but how that something should be done has been less clear. The war produced an experiment on a large scale. Hundreds of people of the clerical and administrative groups had, for security reasons, to leave London whether they wished it or not. These have adjusted themselves, some successfully, others unsuccessfully. The Bank of England posed the problem whether clerical, administrative, and allied departments could in normal times be efficiently worked away from London. The National Council of Social Service was asked to undertake the survey.[1] It was clear from the beginning that reliable evidence would be difficult to obtain. The sorting of facts from assumptions emotionally motivated, not to mention the border-line information between the two, was in itself formidable. People compulsorily removed from their familiar surroundings and living under makeshift conditions naturally compared the often purely imaginary amenities of pre-war days with the present discomforts. Making all allowances for the necessarily unscientific comparisons, there seemed to be certain advantages believed with reason by many people to be inherent in London which could be checked. These included greater choice of accommodation and type of district, wider choice of schools and better provision of scholarships, better chances of promotion and wider choice of employment, better marriage chances for women, and unequalled prestige and glamour. Employers thought there were better contacts between various offices and also with leading consultants. The disadvantages were the amount of travelling involved in getting to and from work and to the country, the discomfort of the overcrowded vehicles, the higher cost of living, and the high rent of offices.

This report was concerned chiefly with clerical workers earning between £200 and £500 a year, most of them men with families. There were some women, most of whose salaries did not exceed £250. The problem was concerned with their probable dispersal to provincial towns of medium size, roughly from 40,000 to 100,000 in population. What is the health problem? So far as general practitioners are concerned there was no evidence that the provincial doctor was inferior to his counterpart in London. Some people stressed the view that the provincial doctor was likely to have a more varied experience and a more stable connexion with families. Consultants and specialists, however, are not likely to be found in a small town unless there is a special reason for their presence—for example, in a university town where there is a medical school, or in a spa where invalids congregate. The resident in a small town is in this respect at a disadvantage; he will have either the expense of travelling to see the specialist or the still greater expense of bringing the specialist to him. A number of special hospitals exist, both large and small, to deal with specific classes of illness—e.g., diseases of the ear and throat—or for specific classes of persons—e.g., children, women, or seamen. The distribution, however, of these is very uneven: the tendency is increasingly to deal with most kinds of cases at large general hospitals. Many families attached importance to the provision of private beds. The number of beds reserved for private patients in each voluntary hospital in the country and the fees charged vary considerably. The range of fees is rather wider in London than in the counties. On the whole the provision for confinements at moderate fees is scanty, and is less satisfactory in small towns than in great cities. Special services such as massage or electrotherapy and some of the newer methods of diagnosis are not so easily obtainable in small towns. Although most provincial towns of any size will have competent dentists, yet, at present, medical and allied services are on the average inferior except where there is a university.

Quite apart from the problem of the treatment of sickness when it has occurred there is the provision for those public health services necessary for the preservation of health. Wherever dispersal was discussed with those who had to leave London it was found that living accommodation was uppermost in the minds of many employees. Many were living in most uncomfortable circumstances and there was no chance of renting a house. Office accommodation is also important, and there is no doubt that many makeshift and unsuitable buildings have been the only possibility. While employees will put up with these discomforts during the war, they will not be content to do so after the war. It must be admitted that employees often overlooked that there are some extremely unsuitable offices in London. It is also very difficult to discover what exactly people mean by London. Large numbers of the population who live in a London suburb rarely leave the suburb; they may go to the West End or the City for occasional excursions, but so also do people from many miles away. There was much evidence that people like the idea of the possibilities of education and amusement that existed, even if they never or only rarely used them. Perhaps the bedrock idea is the dislike of being uprooted. It might well be that if hundreds of people hitherto resident in a small town or village had to leave they might equally resent removal, even though it were to London.

The report recognizes that those of the present generation who have to migrate will find life difficult, but that it will be very different for the next generation who will be free from London ties. The long-term balance-sheet of advantages and disadvantages differs from the short-term balance and is more favourable. In the national interest several great cities ought to be gaining, not losing, population. Many provincial towns of moderate size would gain by an increase of population, and such an increase would facilitate social, educational, and medical improvements. The committee held that such powers as the local authorities will need to enable them to play their part adequately should be granted by the Government if legislation is necessary. The public services to be considered are water, electricity, gas, sewage and sewage disposal, transport. The local authority will have to consider provision for more children, and the public health depart-

[1] *Dispersal.* An Inquiry made by the National Council of Social Service. Oxford University Press. 1944. (3s. 6d.)

ments will have to see if extra hospital accommodation or clinics are necessary. This means that the reception areas will have much careful planning to do. There is a list at the end of the report of towns of medium size within 80 miles of London with populations from 20,000 to 100,000.

The committee recognized that it will be no easy matter to reverse the trends of centuries, and the report has considered only the clerical workers. There is the analogous problem of the industrial worker.

PENICILLIN AND SPIRAL ORGANISMS

Although penicillin and the sulphonamides cover much common ground, each has fields of activity in which the other takes no part. Perhaps the most important direction in which penicillin is of value while the sulphonamides have none is in the treatment of "spirochaetal" infections, using that word in its broader and less legitimate sense. The place of penicillin in the treatment of syphilis is now almost assured; if long-term results are satisfactory it may replace the arsenicals altogether, at least for the primary form of the disease. It would be rash to assume that all spiral organisms will react in the same way, since they include a number of widely distinct genera, but scattered items of information are coming to hand which suggest that some degree of susceptibility to penicillin is a common property among many of them. The rapid disappearance of *T. vincenti* from the lesions of Vincent's gingivitis reported by MacGregor and Long in this *Journal* last week is one such piece of evidence from the clinical field. Others are so far experimental only: an effect on *Sp. minus* and on *T. recurrentis*, first reported by E. M. Laurie and H. O. J. Collier,[1] has been confirmed by F. R. Heilman and W. E. Herrell[2] and by H. Eagle and H. J. Magnuson[3] respectively. The former authors found penicillin curative in experimental mouse infections due to either *Sp. minus* or *Streptobacillus moniliformis*; both forms of rat-bite fever may therefore prove amenable. Eagle and Magnuson, studying infection with *T. novyi* in rats and mice, found that, although 50% of cures could be obtained with a dose of about 100,000 units per kg., 95% cure called for 400,000 units per kg., a dose of which the equivalent in man is about 25,000,000 units. If all species of *Treponema* causing relapsing fever behave in this way, and if findings in mice prove applicable to man, penicillin is unlikely to displace arsenic for the treatment of this disease.

Leptospiral infections must be regarded differently, because arsenic is useless for them. Even should *L. icterohaemorrhagiae* be only moderately susceptible to penicillin, the treatment of Weil's disease should still be attempted, since there is no chemotherapeutic alternative. Some indications that this treatment may prove useful are to be found in two papers in our present issue. J. M. Alston and J. C. Broom began by determining the concentration of penicillin which would inhibit the growth of 9 strains of the organism in cultures; all were inhibited by 0.4 unit of penicillin in 3.5 ml. of medium—i.e., a concentration of just over 0.1 unit per ml. This is about five times the concentration necessary for preventing the growth of a normally sensitive staphylococcus, but the fivefold dilutions used do not enable an exact comparison to be made between the two organisms. The first therapeutic test failed, evidently owing to infrequent dosage; in the second, penicillin was administered three times a day in oil, with the result that 6 out of 7 treated animals survived, the seventh dying apparently of some other cause, while 4 out of 8 controls died. These findings, although inconclusive owing to the small numbers of animals used, encourage further observations. In the patient with Weil's disease described by V. Lloyd Hart, penicillin was given at too late a stage to judge its effect on the course of the disease, but may have contributed to eliminating the organisms from the urine. So far as they go, these observations justify the clinical trial of penicillin in the treatment of Weil's disease; early diagnosis and perhaps generous dosage will be necessary.

[1] *Ann. trop. Med.*, 1943, **37**, 200.
[2] *Proc. Staff Meet. Mayo Clin.*, 1944, **19**, 257.
[3] *Publ. Hlth. Rep. Wash.*, 1944, **59**, 583.

DENTAL SERVICE REPORT

The Interdepartmental Committee on Dentistry, of which Lord Teviot is chairman, has issued an interim report to the Minister of Health and the Secretary of State for Scotland which is published as Cmd. 6565 by H.M. Stationery Office at 6d. The committee unanimously recommends that a comprehensive dental service should form an integral part of, and operate simultaneously with, the Government's National Health Service, and that it should be available to all who want to use it and be paid for by the community as a whole. It recommends also the establishment of a general dental practitioner service broadly analogous in principle and structure to the proposed general medical practitioner service of the National Health Service, and that dental health centres on experimental lines should be set up in suitable areas without compulsion either on dentists to work in them or upon patients to attend them. The committee recommends that measures to stimulate the recruitment of dentists should include every step to encourage suitable ex-Service men and women to enter dentistry and that dental teachers should be released from the Forces at the earliest moment. Another main point is that the public should have more dental health education, dealing with questions of diet and dental hygiene, as well as stressing the need for regular inspection and treatment. Further reference to the report will be made in a later issue.

THE R.A.V.C. IN THIS WAR

Sir Clifford Allbutt would not work in blinkers; he had to see all round him. He often pleaded the cause of comparative pathology, and in effect what he said was: there is only one Medicine, and we all have a lot to learn from each other. The *Veterinary Record* for Nov. 18 contains an article by Major A. V. Franklin on the work of the Royal Army Veterinary Corps in the Mediterranean theatre. By reason of the progressive mechanization of the Army the outbreak of this war found the Corps shrunk to a shadow of its former self. Major Franklin traces its history from the early days of mobilization to the present time. The primary cause of its regrowth was the formation of a Cavalry Division for service in Palestine. After 1940 the horse, mule, and camel began to come into their own again, and with them the R.A.V.C. During that year all ranks were trained to be ready in the event of heavier calls, so that they could form a sturdy framework for further expansion. In 1941 the duties performed by the Army Remount Service were transferred to the Corps; this unity of control led to a notable increase in efficiency and economy. In the campaigns of Eritrea, Greece, and Syria the R.A.V.C. played an active part. In 1942 further important duties were assigned to it—meat inspection and the administration of livestock depots. The campaign in Italy gave the Corps its first occasion in this war to play an active part in large-scale operations. The difficult nature

of the country made heavy demands on mule transport, and it became the responsibility of the R.A.V.C. to meet all requirements. This work called for intimate knowledge of the remount side and also for vigilance on the part of purchasing officers to prevent such scourges as glanders, epizootic lymphangitis, and mange from being introduced into the distributing depots. These and other activities led to rapid expansion of the officer strength. High credit is due to the administrative staff for the way in which the Corps, greatly diminished owing to mechanization, expanded so quickly and so successfully while taking over the additional duties of a remount service. Medical men who made friends with veterinary colleagues while serving in the last war will be glad to know how the R.A.V.C. has risen to the occasion after a period of enforced decline.

PACKAGING OF MEDICAL SUPPLIES

With the prospect of increasing war activity in the Far East the preservation and packaging of war supplies, including medical supplies, becomes of growing importance. Stores may have to be landed on beaches instead of at ports and carried on muleback or on men's shoulders far into the jungle, exposed to the rigours of tropical climate. In the earlier days of the war vast quantities of stores arrived at their destination in a useless condition owing to improper packing at the source. The "global" nature of the war lends special interest to an exhibition of packing methods, in which the British and American Army authorities have co-operated, at the Central Ordnance Depot at Feltham in Middlesex. A section is devoted to medical stores, and here we can witness the American genius for packing. The eye is caught by 100,000 Oxford units of penicillin packed in a bottle large enough for the distilled water necessary to produce the required concentration. The bottles are packed in a divided carton inside a corrugated box; this again goes inside a larger corrugated box, around which is a waterproof-bag liner, and the whole is placed in a nailed wooden box. Plaster-of-Paris bandage, susceptible to damage by water, is sealed inside a metal-foil laminated package; this is cartoned and put into a waterproof-bag liner which is nailed up in a wooden box. Surgical instruments are cleaned and preserved, then all contacts and moving points are press-fitted with small pieces of aluminium foil; the entire instruments are laid between sheets of the same foil and sealed inside a laminated, regenerated cellulose bag. A waterproof-lined wooden box encloses these envelopes. Each unit of blood plasma is packed in two bottles—one containing distilled water, the other the cakes of blood plasma. Each bottle is sealed in a tin, together with the rubber and glass tubing, needles, bottle hanger, and auxiliary caps needed for the transfusion operation. The units are cartoned, and a wooden box lined with waterproof material holds several cartons. Sulphuric acid is packed in glass containers fitted with rubber-gasketed plastic caps. Several bottles of this are packed in a divided case entirely surrounded by material made out of rock wool. An emergency refrigerated serum box uses dry ice and sufficient thickness of bitumen-treated creped cellulose wadding to maintain serum at a temperature of $-10°$ F. for nine days. This is used only when refrigerated transportation is not available. *X*-ray tubes are enclosed in a canvas bag suspended in a wooden frame and put in a corrugated fireboard box with greaseproof wrappings, and this again in a nailed wooden box. *X*-ray film is put in a tropical bag, and this again in a metal box with soldered seams and tear-off strip.

The purpose of the exhibition is to impress upon manufacturers that it is part of their job to ensure the proper packing of their goods. The Army services units cannot be expected to be specialists on the 150,000 different types of stores at an ordnance depot. The use of preservatives against corrosion, the provision of protective layers between the atmosphere and critical metal surfaces, the value of neutralizers for finger-prints, the compressed-air method of drying, and the never-failing serviceability of greaseproof wrapping-paper, waxed cartons, and waterproof envelopes are brought home to the least expert observer. Of equal importance is the precise labelling of each package so that there may be no unnecessary opening and exposure to ascertain its contents.

DIAGNOSIS OF ANGINA PECTORIS

In many cases the diagnosis of angina pectoris depends entirely on the patient's account of his subjective symptoms. Nothing may be apparent on examination, and the electrocardiogram may be normal. Records taken by chance during an attack of angina have shown changes in the T wave or the R–T interval. Sometimes these transient changes have resembled the more permanent features of the curves of myocardial infarction. In this way the part played by myocardial ischaemia or anoxaemia in their pathogenesis has been established. Recently in the United States, Master, Nuzie, Brown, and Parker[1] have studied the effects on the electrocardiogram of what they have called the "two-step" exercise in patients suspected of having disease of the coronary arteries. They have devised a simple standard step exercise, graded according to the age and weight of the patient. The five leads of the electrocardiogram were first taken at rest, and the pulse and blood pressure were recorded. Immediately after the test the curves were taken again, and then ten minutes later. In normal persons no changes in the curves were noted. In 13 out of 20 persons with disease of the coronary arteries transient abnormalities appeared in the T waves or the R–T intervals. In order to prove that the changes were due to myocardial anoxaemia the patients were made to breathe an atmosphere containing only 10% of oxygen. The result of this was to produce curves similar to those which were obtained after the exercise. This procedure was not entirely free from unpleasant consequences. Patients with valvular disease also showed signs of relative coronary insufficiency, presumably the result of diminished output from the left ventricle. Patients with effort syndrome also gave positive results, due, it was thought, to the poor output of their hypoplastic hearts.

It is doubtful whether these procedures are of real practical value in ordinary clinical practice. Special technique is needed to take the curves quickly enough after the test to record the transient changes, and each patient requires at least six films. The chief disadvantage is that in about a third of the cases with coronary artery disease results are negative; also in some instances the results are positive although disease is absent. It is interesting to observe that breathing air with a diminished oxygen content caused the same curves to appear as those which were found after exercise. The diagnosis of angina pectoris must still mainly depend upon the accurate and careful taking of the history and upon a clear understanding of the nature of the symptoms, negative findings in all available methods of examination notwithstanding.

We regret to announce the death of Sir Joseph Arkwright, M.D., F.R.S., for many years honorary bacteriologist to the Lister Institute, and joint author, with his colleague the late Sir John Ledingham, of *The Carrier Problem in Infectious Diseases.*

[1] *Amer. J. med. Sci.*, 1944, **207**, 435.

THE ROYAL COLLEGE OF SURGEONS

MEETING OF FELLOWS AND MEMBERS

A meeting of Fellows and Members of the Royal College of Surgeons of England was held at Lincoln's Inn Fields on Nov. 16.

Sir ALFRED WEBB-JOHNSON, the President, at the outset referred with satisfaction to the presence at the Council meeting of six invited representatives of special departments of practice, including general practice. Of these six, four were Fellows and two were Members (one of them Dr. H. Guy Dain). It was proposed that, in the Supplemental Charter which would be applied for after the war, power should be obtained to co-opt such representatives to the Council. It was obvious that representatives of special departments of practice, however much their presence was desired on the Council, might not be successful in the general elections of Council members, and it would be grossly improper for the Council to indicate to its electorate that, for example, a radiologist or an oto-laryngologist was desired. Therefore power was being sought to co-opt.

In commending the general Annual Report the President referred to the generous gift of £100,000 by Sir William H. Collins for the endowment of the department of pathology and the institution of a chair of human and comparative pathology. Dr. Willis of Melbourne had been appointed as the first professor. Concerning the rebuilding of the College and the proposal to build the other Royal Colleges on adjacent sites, the possibilities of building elsewhere had been explored, but the manifest advantages of the present site in Lincoln's Inn Fields seemed to outweigh them. A building committee had been set up and an architect engaged. An appeal would presently be made to Fellows and Members. Already £12,000 had been accumulated, including a gift of £2,000 from the American College of Surgeons.

On the motion of Mr. MCADAM ECCLES, seconded by Mr. J. B. HUNTER, the objects of the proposed Supplemental Charter were approved by the meeting—namely, to grant the Fellowship to ophthalmological candidates under special conditions, to grant a Fellowship in dental surgery, to increase the number of permitted elections to the Fellowship in each year and to render non-Members eligible for such election, and to co-opt to the Council up to six additional members representative of special branches of practice.

The meeting also gave general approval to what had been done in regard to the site for the enlarged building.

The White Paper

The PRESIDENT then asked for expressions of opinion on the White Paper. He asked for first consideration to be given to the proposed administrative structure and also to the question of freedom for the profession. That freedom would be encroached upon unless independent—he disliked the word "private"—practice was preserved. Those of them who were in responsible positions had had discussions, formal and informal, with the Ministry, and he believed that they had made it plain that on the fundamental points there could be no compromise. Having taken a firm attitude on fundamentals, it was possible to give way on non-essential details.

Mr. LAWRENCE ABEL said that what they did not want was further control of the profession. Medicine would make progress in so far as it was free, not under bureaucratic control. The reform he had hoped to see was an enlargement of the present National Health Insurance which did not imply control of a free profession and left private practice untouched. Mr. DICKSON WRIGHT declared himself against the whole system of social security. He did not believe it was inevitable and he thought it should be fought. A new Parliament should deal with the matter.

The PRESIDENT agreed that it was desirable to have a new Parliament to deal with the matter, but unless there was an outcry from the people to that effect, an outcry from the profession would not carry much weight. He then asked the meeting (which numbered some 50 Fellows and Members) whether it agreed with nine points which had been tabulated by the Council as of fundamental importance. The assent of the meeting was given to each point in turn, and there appeared to be no dissent. The points were as follows:

(1) That the administrative structure, both centrally and locally, should be modified to ensure that the medical profession had a more direct responsibility for advice and administration through nominees chosen by representative bodies of the profession.

(2) That the scheme should not apply to the whole population, and that the general practitioner service particularly should be "provided" only for those below a certain income limit.

(3) That contributions under a social security insurance scheme allotted to the health services should be devoted entirely to the financing of the general practitioner service, and that the hospital and consultant services should be provided for by general taxation.

(4) That the regions for hospital administration should be large enough to provide a complete service for all purposes, and that no existing local authority is in a position to provide such a complete service.

(5) That there should be no "direction" of members of the profession, but that they should be free to practise in places of their own choice. An adequate supply of doctors should be obtained for areas sparsely staffed by offering special inducements.

(6) That the security of the voluntary hospitals should be ensured.

(7) That tendencies towards the conversion of the profession into a whole-time salaried service should be resisted.

(8) That control of the profession by the Civil Service and the local authorities was not in the best interests of the people.

(9) That the facilities of Health Centres should be available for all practitioners in the district.

The Goodenough Report

The PRESIDENT then made some comments on the report of the Interdepartmental Committee on Medical Schools. He said that the report was an extremely valuable document and had assembled some information which should enable right conclusions on this subject to be reached, which did not mean necessarily that the committee itself had reached right conclusions. The Council of the College was rather disposed to quarrel with the Ministry for changing the terms of reference without informing Parliament or the College. It also disliked certain features of the report suggesting that the power of the purse should be used to enforce certain proposals, such as that every medical school should admit women, that the curriculum should be reformed before any additional grants were made for medical education (the reform of the curriculum was entirely an affair of the General Medical Council, which ought not to have pressure brought to bear upon it by a Government Department), that grants to schools should depend on the number of students attaining the degrees of the university, and that the examination fees after meeting all expenses should be devoted entirely to undergraduate assistance. The Council thought that a student who entered a great profession like this should have some proportion of his fee go to the maintenance of a headquarters which would be available to him throughout his career, particularly a headquarters like the College, which provided museum, library, research laboratories, and facilities for meetings. The Council thought that the report placed undue emphasis on academic teaching without proper regard to the value and importance of being trained in the art of medicine and surgery. "Perhaps the thing which concerns this College most intimately, and I hope will concern the whole of the profession, and your great Association, Dr. Dain, is the tendency towards saying that there should be no other means of qualifying for the profession than university degrees. We contest that very strongly. We regard it as the duty of a great corporation like this, which through the centuries has insisted on a high standard being attained by practitioners of surgery, including a proper standard of practice after qualification, and a proper ethical standard, to maintain a portal of entry into the profession which is entirely under the control of the profession and independent of any subsidized body like a university." (Applause.)

He pointed out that the Royal Colleges had an international significance, with an influence in the Dominions and in British possessions abroad such as no individual university could exert. On the question of clinical professors the Council took the view that a professor of surgery should not be barred from independent practice within limitations. "You are not going to get the best young men by restricting their activities in that rigid way." The Council also took strong exception to the view that all schools should be large. It had been deeply impressed by the value of the smaller medical schools, and those who were teachers knew that many men did well in small classes who would do far from well if thrown into a large class of a hundred or so. They also felt that the Goodenough Committee was unduly anxious about the number of medical schools in Central London. If London was to maintain its position as a great consultative centre its hospitals should be quickly accessible from the great London termini.

The President's remarks were endorsed by the meeting, no contrary opinions were forthcoming, and the proceedings ended with an exposition of the plans for the rehabilitated College.

EXCHANGE OF INFORMATION BETWEEN ARMY AND E.M.S.

We print this week a letter from Major-Gen. D. C. Monro, Consulting Surgeon to the Army, on the subject of follow-up postcards for the interchange of medical information between Army hospitals on the Continent and the E.M.S. hospitals at home. His letter is an appeal to E.M.S. surgeons. To the Medical Research Council is due the credit not only for appreciating that such an exchange of information would be of great value to medical officers engaged in routine war medicine or surgery, or in research projects, but also for having inaugurated a system which the Army has since adopted. During the last war the M.R.C. printed a special card and distributed it free to various medical units with the B.E.F. The idea was repeated

in the Middle East Force, and has been in action there since 1941. The new and official Army Form I.3216, reproduced below, was planned on almost identical lines. The M.O. or

Army Form I·3216.

INTERCHANGE OF MEDICAL INFORMATION

FOLLOW-UP CASE CARD

Particulars of Patient :—

Name (*Use Block Capitals*)

Number Rank

NATURE OF CASE

Date (of casualty) (of admission)

NOTES ON CASE

PROGRESS at subsequent units. Kindly post the card as addressed when patient's progress can be predicted.

UNIT and DATE	NOTES and SIGNATURE

P.T.O.

surgeon wanting information about what happens to his case completes the patient's particulars, with a note on the case, and stating clearly what information he especially wants, and addresses the card to himself on the back. It is then slipped in the envelope containing the patient's documents on transfer. At each subsequent unit through which the patient passes on his way to the base or home hospital, the M.O. will write, in the section headed "Progress" (which is continued on the other side of the card), the number of the unit, the date, and an interim note on the patient's condition. A final note is required in this section as soon as the outcome of the case can be predicted with any degree of certainty. This is the point at which the civilian surgeon at home can earn the thanks of his colleague in the field, by completing the card and putting it into the post, so that it goes back to the man who started it on its journey.

FOREIGN DOCTORS: A MEETING AT B.M.A. HOUSE

Since September, 1939, this country has witnessed a peaceful invasion of its shores by a growing number of men and women from the unhappy Continent of Europe, and among them have been many medical men and women who have either taken a place in the civil medical services or have served with the remnants of their own Forces. Our own pressing problems, domestic and national, have made it difficult to see as much of them as we could have wished, but contact between British doctors and their colleagues from Europe and the other side of the Atlantic has proved a fruitful stimulus. Possibly our foreign guests have learnt something about British medicine and from British doctors. There can be no doubt that we in our turn have learnt much from them. In particular, doctors in this country have come to look at familiar problems in both the practice and the organization of medicine from a fresh standpoint. The crust of our insularity—perhaps not so thick as popular tradition holds—has certainly been broken here and there with benefit. It is healthy to re-examine the foundations of tradition, even though such an exercise may give a temporary feeling of insecurity.

A gathering in B.M.A. House last week of medical men from eight European countries, which was arranged by Dr. George de Swiet, was in itself an example of how much can be gained even at an informal meeting between doctors of different nations. The meeting was in a sense an opportunity for saying *Ave atque vale* to men and women who hope soon to return to their own countries to deal with the terrible aftermath of German invasion. Dr. Dain, the Chairman of Council, struck a note that found a ready response among all those present when he observed that if there were a wider diffusion of the spirit that permeated medicine, the prospects of future peace might be made secure. There were, he said, no frontiers in medical knowledge, there were no monopolistic restrictions in medical discoveries. Medicine was truly international. British doctors had a big sense of obligation and gratitude to their foreign colleagues, because we were conscious that we had been spared the misery and destruction to which almost the whole of Europe had been subjected. If, therefore, out of that meeting there came some movement for giving a permanent expression to the bonds which hold together doctors of different countries, then the British Medical Association would feel it a privilege to give all the help it could to make such a movement successful. Dr. Dain's welcome was endorsed in a few words from Dr. C. Hill, Secretary of the B.M.A. Dr. Alfred Cox then gave those present a most interesting short history of the Association Professionnelie Internationale des Médecins, recalling how the proposal to hold the Annual Conference in Prague in 1938 was defeated by the German delegate, who considered this an insult to the master race. Dr. Cox felt now, as he felt in the early days of the A.P.I.M., that an international organization of doctors should take as its field of activity what might be described as medical sociology or medical politics. Such an organization should provide a framework within which doctors of all countries could discuss common professional problems, and should not attempt to include medical science, which was well covered by various international congresses for various branches of medicine. The idea of the A.P.I.M. came originally from Poland and was enthusiastically taken up by Dr. Decourt of France.

The views of many were summed up by the Norwegian Minister of Health when he said that in the new kind of world which they were hoping to reconstruct after the war medical services would have to some extent to be reconstructed also. But they should remember that the medical profession, through its doctors, had over a period of hundreds of years become moulded into the society of which they formed a part, and that any attempt to break this mould might be harmful. That the doctor should prove a beneficial force in society outside his strictly professional sphere was a view put forward by another speaker. Among them all was a clear desire for a common organization, so that in peace the profession of medicine at least could see that national rivalries were transcended. Those foreign delegates who spoke were: Dr. C. Meissner (Chairman of the Polish Medical Association), Dr. Karl Evang (Norwegian Minister of Health), Dr. J. Ungar (Czechoslovakia), Col. C. F. Koch (Dutch Army), Dr. M. Sekulić (Yugoslavia), Col. B. A. Osipov (Soviet Military Mission), Dr. A. D. de Smet (Belgium).

The University Extension and Tutorial Classes Council, in co-operation with the Provisional National Council for Mental Health, is prepared to hold this year, provided sufficient applications are received, the usual course on mental deficiency and allied conditions. It is hoped that the course can take place, as in recent years, at the London School of Hygiene and Tropical Medicine, Keppel Street, Bloomsbury, and the date fixed is March 12 to 23, 1945. Students must arrange their own residence. The course is intended for qualified medical practitioners, more especially those who are engaged as school medical officers, certifying officers to local authorities under the Mental Deficiency Acts, or as medical officers in institutions. Detailed time-tables and other information will be sent out to each person proposing to attend the course about a week before it begins. As the course can be held only if sufficient applications are received, intending candidates should apply at the earliest possible date, but in any case by Feb. 24. The registration fee of 10s. 6d. must be paid at the time of application and the fee for the course before March 3. If applicants withdraw before that date the fee of £5 15s. 6d. will be returned or carried forward to another course as preferred. Should the course have to be cancelled all fees will be returned. Cheques should be made payable to the Provisional National Council for Mental Health, and crossed Barclays Bank, Ltd. All communications should be addressed to Miss Evelyn Fox, C.B.E., c/o University Extension Department, University of London, 39, Queen Anne Street, W.1.

Correspondence

Interchange of Medical Information

SIR,—The surgeons with the B.L. Armies are bitterly disappointed that so few of the follow-up postcards (A.F. I.3216) which they have enclosed in the envelope containing the field documents of wounded men evacuated to U.K. have so far been returned to them by E.M.S. surgeons treating these patients subsequently.

The Consulting Surgeon to this group (Brig. A. E. Porritt) has written (Oct., 1944): "If only the E.M.S. would realize how eagerly these cards are awaited over here, I am sure they would make a greater effort to return them. Not more than 1% have been returned since D Day." Quite apart from the natural interest and eagerness of individual surgeons to hear how their cases have progressed, this information, together with comments and constructive criticism, is a valuable factor in improving the standard of surgery in the field.

Instructions on the employment of the follow-up postcard issued by the Army and E.M.S. are almost identical and quite explicit. Naturally enough, the Army surgeons cannot understand why a system which worked between the forward and base hospitals in M.E.F. and C.M.F. should not work equally well between the Army hospitals in France and Belgium and the E.M.S. hospitals in the U.K. It is scarcely surprising, therefore, that our surgeons are inclined to blame the E.M.S. for its failure in this instance. It would be a great pity if this mutually beneficial liaison between two large groups of the profession cannot be improved, particularly as both are doing such splendid work on the same job.

It is not easy to discover why these cards are not returned. I suspect that the different systems of documentation are mainly responsible. I believe the plan tends to break down at the point where the essential clinical information which should be written on the field card is first transferred to the E.M.S. case sheet. The follow-up card is either missed or returned to the Army envelope to be dealt with later—and thereafter forgotten, because to the surgeon who has to plan the patient's treatment it is of little clinical importance.

Whatever the cause, I am quite sure that the majority of E.M.S. surgeons are quite unaware that there has ever been any complaint. I am equally convinced that as soon as their attention is directed to this a remedy will be found, and this valuable system of interchange of information will work smoothly. Therefore, with the above object in view, and with the approval of the E.M.S. authorities, I have decided to request you to publish this letter.

I feel that a personal and unofficial appeal on behalf of the surgeons of the B.L.A. in your popular and influential columns is assured of a wide individual attention and will receive a sympathetic hearing.—I am, etc.,

D. C. MONRO,
Major-Gen., Consulting Surgeon to the Army.

Service Medical Officers and Demobilization

SIR,—The statement on demobilization by the Central Medical War Committee makes it clear that release of medical officers both in Class A and in Class B must depend to a large extent on the continued recruitment of medical practitioners who have not yet been called up for service.

At present there are considerable numbers of medical men holding appointments under the Emergency Medical Service who qualified in the earlier years of the war and in some cases several years before the outbreak of hostilities. Many of these are now well over five years qualified and most of them over the age of 28. This group of practitioners has worked hard and efficiently, but it must be borne in mind that in comparison with their contemporaries who joined the Services they have had exceptional opportunities for obtaining valuable clinical experience in all branches of medicine and surgery which have not been usually available to those in the Services. Moreover, a considerable proportion have been able to take higher qualifications. In addition, they have had little interference with their domestic lives and liberties.

Medical officers in the Services, many of whom have been over-seas for years, unable to acquire higher qualifications, and often with few facilities for obtaining clinical experience, will feel themselves unfairly dealt with if they are retained in the Services while the younger members of the Emergency Medical Service remain in civilian life. I trust, therefore, that the Ministry of Health will accept the recommendation of the Central Medical War Committee with regard to the continued recruitment of doctors up to at least the age of 35.—I am, etc.,

Guy's Hospital, London, S.E.1. J. J. CONYBEARE.

National Thoracic Surgical Service

SIR,—In your leader of Nov. 11 (p. 633), which is devoted to an appeal for the formation of a national thoracic surgical service, it is suggested that the regional medical staff "should be composed of a director, or assistant director, a number of surgical officers of the standard of registrar, and house-surgeons, physicians, and radiologists." If the staff appointment is to be in the order of importance indicated by the first four, then it would seem that the two latter are considered the least important. Presumably the director is to be a thoracic surgeon who has had the training indicated as desirable in the second paragraph of the second column on p. 633, for we are told in an earlier paragraph that "the time has passed, or should have passed, when the physician calls upon or directs his surgical colleague to perform some particular operation upon the chest . . . the operative procedures necessitate a high degree of surgical skill and must be supported by an equally skilled anaesthetic technique."

The acquisition of skill in the highly specialized technique is no small achievement in this sphere, and the desirability of a co-operating team to assist must be acknowledged; but as "the understanding of thoracic diseases alone requires considerable experience," has the time passed when the direction should pass out of the hands of the physician? With the use of drastic and heroic surgical measures which the patient may now survive it would seem that more than ever it is essential for an experienced physician to be at the helm, and as so much depends on radiological interpretation he should preferably have the helpful co-operation of an experienced radiologist. They have the experience that even the graver chronic lesions in pulmonary tuberculosis can be cured or alleviated and endured often cheerfully for 20 or more years by patients who are able to continue to do their duties; and that pneumothorax, unilateral or bilateral, may fail to collapse a cavity, that this may not be accomplished even with the aid of division or resection of pleural adhesions, avulsion of the phrenic nerve, and/or pneumoperitoneum; that the lung may fail to re-expand, that the pleura may become thickened and fixed, and that thoracotomy is not always successful in obliterating the empty space; and that when this is done the disease may then express itself in the opposite lung. To repeat the series of operations on the remaining side would logically appear to be as essential, but, alas——! We were always taught that the best method to assist the tuberculous patient was to build up his resistance. It is difficult to believe that a patient who could withstand such a series of operative measures and overcome the disease would not have done so without; even a fit man would have difficulty in surviving.

The history of a child who had been discovered to have clubbed fingers by the school doctor, who rightly suspected a pulmonary lesion, for which pneumothorax was followed successively during the next 18 months by bronchography, bronchoscopy, biopsy, an unsuccessful attempt at surgical removal, deep *x*-radiation, multiple tappings for the removal of fluid, a second unsuccessful surgical attempt at removal, deep *x*-radiation, and finally death, makes one think there was great need for a kindly physician who would have treated the patient rather than the radiographic appearances.

From my experience I should say it was highly desirable that any surgical work on the chest should be directed by an experienced physician. The merit of the work of the general physician or surgeon is that it is within the reach and grasp of the student and general practitioner, but specialization such as this tends to keep aloof and avoid the criticism which is so desirable. Would not specialization under a State system be even further removed from criticism?—I am, etc.,

Birmingham. J. F. BRAILSFORD.

A National Renal Service?

SIR,—It is to be hoped that the recommendations of the Society of Thoracic Surgeons of Great Britain and Ireland for the institution of a national thoracic surgical service, as outlined in your admirable leading article, will soon be implemented. There is little doubt that such a service would be an immense boon to a large class of sufferers hitherto not able to receive the full benefits that current knowledge, modern technique, and specialist skill are able to supply.

Somewhat similar, and equally valuable, suggestions have recently been made, I believe, for national services based on area organization in the fields of orthopaedic surgery, maternity, paediatrics, and the rheumatic diseases. The principle is obviously one that could with advantage be extended to other special branches of medicine. In one, at least, I am certain that its adoption would prove of inestimable benefit: I refer to the not yet recognized specialty that deals with the medical diseases of the kidneys, and, more particularly, to those disorders generally included under the heading of "Bright's disease." This group is, directly and indirectly, probably responsible for more deaths in this country each year than cancer, primary heart disease, or, indeed, any other group of allied and commonly fatal diseases, and yet there is practically no organized provision for the special needs of its numerous victims.

If, Sir, your readers will substitute the words "renal medicine" for "thoracic surgery" and "renal surgeon" for "thoracic surgeon" in the leader to which I have referred I am sure they will be in no doubt as to the urgent need for a national renal service.—I am, etc.,

A. A. OSMAN.

Incidence of Peptic Ulcer

SIR,—In your leading article on this subject (Nov. 18, p. 665) you stress the need for statistics of the total incidence of peptic ulceration in our population. An excellent opportunity for obtaining these figures presents itself at the moment, owing to the need for certificates for extra milk and eggs for cases of peptic ulceration. Figures of total applications over three months might be obtainable from the Ministry of Food; and general practitioners could keep records of their individual cases.

I have kept records of applications for these certificates in my practice over the last three months, in a largely industrial area of mixed types of occupation. Of my total panel 2.55% have gastric or duodenal ulcers proved by *x*-ray examination. My panel consists almost equally of men and women. Of all my ulcer patients 93% are men, and the age groups are made up as follows: 10–20, 2.5%; 20–30, 10%; 30–40, 10%; 40–50, 65%; 50–60, 12.5%. The absence of younger cases with this condition might be partly due to absorption in the Forces, but such cases would be likely to be discharged by now.—I am, etc.,

Welwyn Garden City, Herts. J. S. ROSS.

Peptic Ulcer

SIR,—The article on this subject (Nov. 18, p. 655) is certainly disquieting, and it throws a great responsibility on the general practitioner, for the results of treatment in established cases are so unsatisfactory that the most hopeful outlook is diagnosis at a much earlier stage or, at least, recognition of those conditions that may be looked upon as the possible precursors of ulcer, where treatment might have a better chance of substituting a remedial course for a vicious circle. The great majority of peptic ulcers have some past history of dyspepsia, but, of course, the great majority of cases of dyspepsia are not embryo peptic ulcers, so it comes to be the hard task of the general practitioner to recognize conditions that may lead to trouble. Cases that recur in spite of treatment will suggest inquiry as to home surroundings, diet, social and economic conditions, hours of work, and the many psychological conditions that are putative progenitors of peptic ulcer.

The doctor will, or should, have the opportunity, if required, of treating his patient in a district hospital bed, where instructions as to rest, diet, and medicine will be carried out. The latter is of special importance, for, although the alkalis most valuable are now generally agreed upon, the time of administration is too often vaguely stated. This is especially important in cases treated at home, where the diet is so often, by force of circumstances, to a large extent the ordinary family food. Lately, for another purpose, I asked a chemist with a "high-class" clientele to find out for me the directions given in 15 prescriptions of alkalis obviously for dyspepsia: of these, 11 were simply "t.d.s., p.c."; only two had any further instructions as to time in relation to food. "After food" is also the direction given with most of the proprietary alkali powders now so very largely used by the public. This direction, so far as I have generally found, is taken to mean soon after a meal, which, of course, is a convenient time from the patient's point of view. Some authoritative statement on this point might be useful. It has been stated that in general in the case of an ordinary or light diet the alkali should not be taken until at least two hours after the meal, as otherwise the essential acid process of gastric digestion would be interfered with.—I am, etc.,

Westbury, Wilts. CHAS. E. S. FLEMMING.

Episiotomy

SIR,—In the correspondence on episiotomy which appeared in the *Journal* within recent weeks the importance of the operation as a means of avoiding subsequent prolapse was not emphasized. This omission has now been remedied by J. D. S. Flew in his article in your issue of Nov. 11. The fact that a woman is more fortunate in sustaining a perineal tear than in having her perineum preserved at the expense of a longer second stage, and consequent overstretching of the paravaginal muscular tissue and disruption of its attachments, has perhaps been recognized and taught more widely and for a longer time than Dr. Flew suggests. Yet the old idea dies slowly—particularly among the nursing profession—and he has rendered a service in again bringing the matter to notice. The immediate advantages to the mother and child (and obstetrician) and the remote benefits to the mother of a well-timed episiotomy are beyond question, and, being in entire agreement with Dr. Flew's main thesis, may I comment on some of the interesting side issues which he raises?

His statement that apart from vault prolapse, as in the nullipara, a low cystocele and low rectocele are the only types of vaginal prolapse cannot be accepted. Prolapse occurs in an infinite variety of forms, affecting both upper and lower vaginal walls and the uterus, sometimes with a hernial pouch or peritoneum, sometimes without. Moreover, a high vaginal prolapse, usually rectocele or enterocele, may be present without any uterine prolapse. Although vaginal and uterine prolapse often occur together in different combinations, it is nevertheless helpful to consider them separately.

Having reminded us of the well-established clinical observation that prolapse, particularly uterine, is rare in patients who have a complete perineal tear, even of long standing, it is a pity that Dr. Flew concludes that the pelvic floor forms the most important support of the uterus and vaginal walls. Apart from the evidence he gives, there is much to substantiate the view that the chief uterine supports are the cardinal and utero-sacral ligaments, together with the fibromuscular fascia which spreads down around the upper vagina, and that the vaginal walls are mainly supported by the fascia lying deep to them. The perineum offers only a subsidiary support; in the upright position the vaginal walls, lying in apposition and sloping upwards and backwards, rest on it, and so does the uterus to a lesser extent, but probably only when it is already in the first stage of prolapse. If the main supports are weakened a strong pelvic floor will not prevent prolapse, whereas if the main supports are intact complete destruction of the pelvic floor does not result in prolapse.

The nearest approach to pure uterine prolapse is seen in the nulliparous type, where the uterus, together with the vaginal vault, descends through an undamaged introitus and lower vagina. Although nulliparous prolapse is not common, it should not lightly be dismissed from consideration—it may have much to teach us regarding the aetiology of uterine prolapse in the multipara. Its predisposing and fundamental cause is an inherent weakness of the supports around the cervix and vaginal vault, this weakness becoming accentuated by atrophic changes associated with the climacteric. The activating factor is sometimes increased pressure from above which results from heavy physical work, a chronic cough, etc.

But not all women whose uterine supports are developmentally weak are destined to remain nulliparous, and the greater number marry and have children. In such case it takes very little damage to the cardinal and adjacent ligaments during pregnancy and childbirth to determine the onset of prolapse of the uterus, either at once or following the climacteric. This does not mean that all such women would ultimately have developed prolapse if they had remained childless, although some would undoubtedly have done so. It means that pregnancy may reveal even minor defects in the supporting system—defects which in themselves might not have resulted in prolapse had not the strain of pregnancy been imposed. It is open to dispute what part an inherent weakness in the uterine supports plays in the development of prolapse in multiparous women, but it is probably an important one. This explains why prolapse may follow an easy confinement and not necessarily a difficult and complicated one. Moreover, it is sometimes possible to foretell in girls and young women that they will subsequently develop uterine prolapse if they have a child. In such the weakness of the supports is indicated by the ease with which the cervix pulls down to the vulva with a vulsellum, and sometimes by an unusually short vagina with a low-lying cervix and generalized atony of the pelvic musculature. Another developmental feature—an unusually low pouch of Douglas—must at times also be an aetiological factor in prolapse—at least in the formation of an enterocele, which, again, is seen in both nulliparous and multiparous subjects.

It is usually stated that vaginal prolapse by pulling on the cervix may ultimately cause uterine prolapse. This is probably true when it is the upper vagina which is affected, especially as the fascia deep to the upper anterior vaginal wall appears to play a part in supporting the uterus, but it is difficult to believe that a *low* cystocele or rectocele, separated from the cervix by an upper vagina with intact supports, as postulated by Flew, can operate in this way. Indeed, it is difficult to say what particular mechanism operating during pregnancy or labour weakens the uterine supports. It can hardly be the softening and stretching of the ligaments occurring during pregnancy, followed by faulty involution; otherwise prolapse following Caesarean section would not be so uncommon. The injury occurs for the most part during the birth process, and, although many explanations as to how it happens have been attempted, none are thoroughly convincing.

From the above it would appear that not all cases of uterine prolapse can be prevented by episiotomy—some patients are destined to suffer it by reason of the supports of the uterus being insufficiently developed to stand even a minimal stress of pregnancy and labour. Yet there is little doubt that episiotomy does protect a large number of patients from uterine prolapse. How it does it is not clear, but probably by releasing the upper anterior vaginal wall and its underlying fascia and, indirectly, possibly the paracervical tissues as well, from the downward pull of the foetal head.

Vaginal prolapse is even more likely to be prevented by episiotomy, which, apart from reducing the risk of general overstretching of the vaginal walls and fascia, releases the anterior vaginal wall from the tendency of the descending head to drag the pubocervical fascia away from its attachments behind the pubis. In particular the patient is least likely to develop a cystocele when episiotomy is performed.

Flew mentions that infection, by leading to subinvolution, may cause prolapse. This is largely a theoretical consideration. The entrance of infection into the area around the cervix, particularly following a tear of the cervix and vaginal vault, nearly always fixes the uterus to some extent and is almost a guarantee against its prolapsing. Similarly, the vaginal wall which is torn and infected rarely prolapses—it is usually the area above it, which has avoided the tear but has been stretched, which descends.

Two further points merit comment. First, whilst agreeing that the duct of Bartholin's gland should be avoided in all operations if possible, if only to preserve the supply of normal lubricating secretion, yet it should be pointed out that if it is cut or ligatured a Bartholin's cyst rarely results. In some types of perineal repair the duct is always divided, and yet it is exceptional to see a cyst of either gland or duct develop. It would appear that complete severance of the duct results in the gland ceasing to function. Secondly, Flew's statement that the vagina is attached to the cervix about the level of the internal os should not be allowed to pass unchallenged. If it were so, the "supravaginal cervix" would cease to exist.

In conclusion, may I repeat that I hope the above comments on some of the more academic questions raised in Dr. Flew's paper will not detract in any way from his main contention—that prolapse, particularly cystocele, can to a large extent be avoided by episiotomy, and that in any case it is an operation which, in the interests of the immediate welfare of both mother and child, should be carried out whenever there is the slightest delay in the second stage of labour, and certainly in every forceps and breech delivery in a primigravida.—I am, etc.,

Liverpool. T. N. A. JEFFCOATE.

SIR,—I should like to thank Dr. Flew for his article on episiotomy, and particularly for his advice "concerning the exact way in which it should be carried out." But one feels that his advice about "the cases in which it should be performed" can hardly be taken seriously.

Dr. Flew tells us that in a series of 135 primigravid private patients he performed episiotomy in 53.3%, and implies that the "practical result would be that an incision would be necessary" in multiparous patients episiotomized as primips, "since the old scar would rupture." Is it not a reasonable deduction that in over 50% of all labours perineal suture will be necessary?

Dr. Flew advocates that midwives be permitted to perform episiotomy, but the suturing of the wound should be left to a medical officer. I do not think many of us will agree with the former, and we might all be rather surprised by the large amount of extra work, remunerated by a meagre fee, produced by the latter.

One of the main reasons for early episiotomy brought forward by Dr. Flew is the prevention of vaginal tears at the time of labour and prolapse subsequently. Are not vaginal tears due to disproportion between the size of the baby's head and the diameter of the vagina? It is a little difficult to see how an episiotomy is going to alter either of these diameters.

One cannot help feeling that Dr. Flew is viewing this problem through his specialist glasses, which are perhaps a little too concave; but to show him how much I appreciated his article I am going to ask him to write a further article (with equally clear diagrams) telling us the exact details of the technique of suture of the perineal wound following episiotomy.—I am, etc.,

Rotherham. ERIC COLDREY.

SIR,—Dr. J. D. S. Flew is to be congratulated upon the firm stand he has taken with regard to episiotomy. I am particularly glad to see that he stresses that, in the primigravida, episiotomy is necessary in over 50% of cases to prevent irreparable maternal and foetal injury during labour, that a timely episiotomy will often make an otherwise unavoidable forceps delivery unnecessary, and that bilateral episiotomy must not be done under any circumstances.

Without wishing to detract from the value of his paper, I should like to point out that the "author's method" of episiotomy was described by Douglas Miller in the *British Medical Journal* (1936, **2**, 4), and the harmful effects of conserving the perineum at the expense of the intracranial structures of the child and of maternal tissues more difficult to repair than the perineum, by myself in the *Journal of Obstetrics and Gynaecology of the British Empire* (1943, **1**, 260), in both instances without any claim to originality by the author.—I am, etc.,

Newcastle-upon-Tyne. WILLIAM HUNTER.

Erb's Paralysis

SIR,—In your issue of Oct. 21 (p. 548) the query was put forward: "What is the treatment of Erb's paralysis in an infant—the result of a very difficult confinement?" From the way in which the question was framed I visualized the inquirer with an infant a few days old on his hands asking for a method of immediate treatment, and it seemed to me that the answer given would be of little help to him.

I doubt if any surgeon would advocate operative intervention in the newborn, and the application of an aeroplane splint is a practical impossibility in a child a few days old requiring bathing, feeding, and attention to the bowels and umbilical cord. The orthopaedic textbooks on the whole give little help in this important problem beyond advocating fixation in flexion, abduction, and supination without any definite explanation as to how it should be done. In this district, mainly owing to the early recognition of these conditions at child welfare centres, I rarely see these children later than a few days after birth, and the good results obtained by early and continuous fixation in the optimum position warrant, I think, a more widespread knowledge of the following simple procedure. It is almost certain to have been published before, although I have not come across it either in the literature or in practice since it was taught me as a student by the late Prof. Archibald Young of Glasgow many years ago.

The method simply consists of strapping the affected hand palm downward to the top of the head. The strapping holds easily on the bald head of the child. The arm is held out of the way and does not interfere with feeding, washing, or general toilet. Further, it fulfils, as no other method I know can, the requisite conditions for early recovery—i.e., relaxation of almost every muscle affected. It can be maintained without trouble for months at a time, and I have been surprised at the number of children with less severe lesions who have completely recovered without any other treatment.

A further modification of the method advocated by Prof. Young was to fix the child's hand in a similar position in a close-fitting bonnet by means of a ribbon stitched into the top of it. I have not found this method so successful as that of direct strapping, as it necessitates removal of the bonnet for washing and presents the difficulty of adjusting it so that it does not slip out of position.—I am, etc.,

Burton-on-Trent. ROBERT BEWICK.

Tie the Cord

SIR,—In your *Journal* of Sept. 23 Mr. C. D. Read gives an account of a tragic experience illustrating the necessity for tying the cord. Only yesterday I had a similar experience. I was called to a B.B.A. The midwife was out on another case. A healthy boy had been born about fifteen minutes. Pulsation had ceased in a particularly gelatinous cord by the time instruments—a laceration required suturing—and a foot of narrow tape had been boiled. The tape bit deeply into the cord and was tied. When I left the house two hours after delivery the baby was well, waiting well wrapped up for nurse to bathe him. When the baby was little over five hours old he was found dead by the nurse when she arrived. The napkins and blankets were soaked in blood, which had obviously come from the umbilical artery, distal to the intact ligature. I noticed that the cord had shrunk and that the ligature, though firm, was therefore not so tight as when applied. The lesson surely is, as Mr. Read remarks, that the cord must not only be tied but tied firmly and examined later, particularly when there is much Wharton's jelly.—I am, etc.,

Bungay, Suffolk. P. G. LEVICK.

Gastro-enteritis and Mastoiditis

SIR,—The article on latent mastoiditis in infants (Nov. 18, p. 659) has brought forward again the vexed question of the relationship of gastro-enteritis and mastoiditis. May I be allowed to stress one point which is so often overlooked. That is the difference in the general condition of the infant with gastro-enteritis and latent mastoiditis and the infant who develops the ordinary and obvious mastoiditis. I am fortunate in having seen many cases of gastro-enteritis and latent mastoiditis (at the Royal Manchester Children's Hospital and the Duchess of York Hospital for Babies, Manchester) and also in having operated on such infants. Undoubtedly pus is often present and bony necrosis has taken place, but the amount of pus has always been small—a bead or two in the antrum and perhaps a further few beads in a large tip cell. Yet these babies have all been desperately ill. (Incidentally the pus obtained has often been sterile on culture.)

If we now think of the infant with the ordinary and obvious mastoiditis we see a very different picture. These babies are usually taking their food well, have had no vomiting and no abnormal stools. Apart from objecting to lying on the affected ear they have remarkably little discomfort. Yet at the operation one finds 5 or 10 c.cm. of thick pus, which, on culture, grows streptococci, pneumococci, or staphylococci in profusion.

Why should one baby be so little inconvenienced by a large amount of pus containing virulent organisms and another infant be moribund as a result of a small collection of sterile pus? Surely it is logical to assume that in the gastro-enteritis baby the pus in the mastoid is at most only one factor in a complex problem? Let me quote one very instructive case—a well-marked zygomatic mastoiditis in a baby five weeks old. The mother stated that the swelling in the temporal fossa was first noticed when her baby was nine days old and had gradually increased. The child remained contented and continued to gain weight satisfactorily. The day before I saw the baby the resident medical officer aspirated 2 c.cm. of thick pus. When the mastoid was opened a further 20 to 30 c.cm. of pus was obtained and there was extensive necrosis in the zygomatic cells, which were unusually well developed.

Here, then, was a baby who at the tender age of nine days developed suppurative mastoiditis. The condition remained undiagnosed for almost a month, but in spite of the large amount of pus the child thrived. I quote this case for two reasons: first, because the child was so very young and therefore might be expected to have little resistance to infection; secondly, because the pus was present for such a long period without any drainage. A large amount of pus may be present in the mastoid process of a young infant and yet cause no severe toxaemia.—I am, etc.,

Manchester. FLORENCE CAVANAGH.

Diphtheria with Severe Tetanus

SIR,—Dr. Johnstone's interesting paper (Oct. 28, p. 555) gives me an excuse for submitting the brief notes of a difficult case of diphtheria which I have been itching to record since 1931.

A boy of about 10 arrived in the casualty department with his doctor's note stating that he was complaining of a sore throat and that there was diphtheria in the house. The boy, usually good, had been seized with unaccountable negativity and had refused to open his mouth for examination of the pharynx; he had even gone so far as to say that he could not open his mouth if he tried. The doctor produced a spatula and the boy's negativity survived heroic wrenchings of his jaws, as was evidenced by the trauma to lips and gums and breaking off of incisor teeth. Seeing he was beat, the doctor sent the boy up and suggested that what was needed was a good talking to or a good hiding to overcome the obstinate creature's resistance.

What was really needed was a good clinician. The casualty officer diagnosed tetanus, acquired from a road accident a week or two previously. A throat swab, taken blindly through the gap of the broken teeth, revealed *C. diphtheriae*. He was treated for both diseases, was in opisthotonos for days, and at his worst spent most of an afternoon under anaesthesia on account of convulsions. After the severest attack of tetanus that I have seen survive he finally recovered.

My reason for recording this case is to ask whether the neurotoxic properties of diphtheria toxin, by diminishing the conductivity of his motor nerves, could have damped down the symptoms of tetanus (severe though these were) and thus aided in the boy's survival.—I am, etc.,

Benenden, Kent. J. C. HAWKSLEY.

Toxic Reactions to Paraldehyde

SIR,—I have read with great interest the article by Drs. Hemphill and Heller on toxic reactions after the administration of paraldehyde (Nov. 11, p. 628). I believe that in a minor degree such reactions are commoner than has ever been recognized. During the past seven years at this hospital I have observed five patients in whom the administration of paraldehyde as a routine sedative has been associated with inequality and partial fixation of the pupils. I note that three of their cases showed pupillary changes. I agree with the suggestion that the question of the possible deterioration of paraldehyde in storage requires attention.—I am, etc.,

C. H. ROGERSON,
Medical Director, the Cassel Hospital.

Psychology in Terms of Animism

SIR,—Please allow me to protest against the serious misrepresentation of my views made by the reviewer of my book *Food for Thought* in your issue of Oct. 14 (p. 502). He writes: "He then states that mind is an aura which can be seen and photographed." I stated no such thing, but wrote: "The glow surrounding the head may be due to attenuated ionization arising from the electrical radiation from brain tissues." Again your reviewer writes: "He goes further and states that the human body loses 2 to 2½ oz. at the moment of death, and that this is the weight of the soul." I never made any statement about the weight of the soul. I mentioned the investigations of Malta, Zallberg Van Zelst, and Dr. Duncan McDougal who claimed to have weighed the "astral body," and then went on: "These experiments proved that something ponderable did leave the body at death, but there was no proof that

it was not merely an amorphous exhalation with no psychical significance." In any case, I was not dealing here with the soul, but with "a third substance, intermediate between matter and spirit, matter of a very subtle kind which would serve as a medium of interaction."

I would suggest that one who is incapable of understanding plain English or who deliberately misrepresents the views of an author is hardly the proper person to review a serious scientific book for the *British Medical Journal*.—I am, etc.,

Carrickmacross. BERNARD J. DUFFY.

Infestation by Two Types of Tapeworm

SIR,—Arising from the letter of G. W. S. Andrews and A. C. Ogilvie (June 3, p. 772) the following account of *Diphyllobothrium latum* infestation in a husband and wife may be of interest. The infestation in the wife was multiple and combined with *Taenia saginata*.

On March 14, 1944, a male patient passed, after treatment, a specimen of *D. latum* 11 feet long; the head was not recovered. The patient had had no symptoms, but during the previous six months had observed tapeworm segments in his stools on three occasions. Some weeks later his wife, who had also noticed tapeworm segments over a period of four years, was given an anthelmintic. She passed a mass of worms which, when disentangled, was found to consist of numerous segments of both *D. latum* and *T. saginata*. One head of *T. saginata* and 35 *D. latum* heads were discovered.

Blood films from the husband on Sept. 4, 1944, showed no abnormality; those from the wife had 11% eosinophils. These patients lived on the top of a hill overlooking five lakes which drain into a tributary of the River Erne, and not connected with the River Shannon. The husband was never abroad. His wife was born in Glasgow of Irish parents. She came to Ireland 23 years ago, where she has since resided, except for two visits to Glasgow (in 1939 and 1942). She frequently ate undercooked meat and raw pork. Both husband and wife consumed moderate amounts of perch, pike, and eels, but no trout.

The existence of *D. latum* was first recorded as endemic in Ireland by O'Farrell.[1 2 3] Subsequently a case was recorded by O'Kelly.[4] The first case of multiple infestation, with three worms, was recorded by O'Farrell.[5] All these cases came from the River Shannon area. The French author Brumpt[6] refers to the finding of 90 *D. latum* worms in one case in Europe. Although simultaneous infestation by two types of tapeworm is mentioned in the textbooks, so far as I am aware the occurrence has not been recorded in this country.

I wish to thank Prof. O'Farrell for permission to record the present cases, and Dr. J. V. McLoughlin, who submitted the specimens for identification and very kindly supplied the histories.—I am, etc.,

Department of Pathology, University College, Dublin. N. O'CONNOR.

Painful Penicillin Injections

SIR,—I doubt if it is universally realized how painful intramuscular injections of penicillin can be; as I am just recovering from a haemolytic staphylococcal infection of my thumb, treated most expertly and with great success by surgery and intramuscular penicillin—16,000 units 4-hourly for 3 days—I feel that I can speak from subjective impressions of its use.

No method of injection is free from pain, but with a good technique it can be greatly minimized. The best site for injection is the lateral vastus muscle. The buttock would be satisfactory, but after injection there it is impossible to lie on one's back in comfort. The most painful method of administration was to insert the penicillin rapidly into the muscle, withdraw the needle, and rub hard; it is only slightly better when the penicillin is mixed with some local anaesthetic.

The ideal technique, I discovered, was to use two syringes, the first containing procaine—1 c.cm. of 2% solution for each 10,000 units of penicillin; the second containing the penicillin. After preparing the skin an intravenous needle is inserted into the thickness of the muscle, but not too near the bone, and the procaine is injected; the syringe is then detached and the needle left *in situ* for about 5 minutes; then, without moving the needle, the penicillin, dissolved in normal saline 5,000 units to the c.cm., is slowly injected. After the needle is removed the site should be swabbed, but not rubbed, with spirit. So far I speak from experience, but with a debilitated patient I believe a hot-water bottle would be additional comfort.

In time, no doubt, penicillin will be so purified that intramuscular injections will be painless; in the interim I am sure the method described above will cause the minimum discomfort.—I am, etc.,

GEOFFREY DEAN.

[1] *Lancet*, 1916, **1**, 466.
[2] Ibid., 1918, **1**, 570.
[3] *Irish J. med. Sci.*, 1929, 6 s., 95.
[4] Ibid., 1935, 6 s., 188.
[5] Ibid., 1930, 6 s., 542.
[6] *Précis de Parasitologie*, Paris, 1936.

"Skiagram"

SIR,—Dr. H. B. Padwick in his letter (Nov. 18, p. 674) has done an injustice to the discoverer of *x* rays. Wilhelm Konrad Roentgen did not "stumble on his discovery by accidentally fogging a plate." It was the fluorescence of a barium platinocyanide screen some yards from the covered vacuum tube which Roentgen was exciting which put him on the track of what he himself later called *x* rays. Sir James Mackenzie Davidson called on Roentgen at Wurzburg in 1896, only a few months after the discovery, and recorded that in reply to his question "What were you doing with the Hittorf tube when you made the discovery of the *x* rays?" Roentgen said that he was looking for invisible rays. Actually it was an English physicist, unconsciously producing *x* rays in the neighbourhood of his stock of plates, who was complaining to the manufacturers that they were sending him fogged plates.

Dr. Padwick wants any word which contains reference to the action of light excluded from use as a name for the negative image produced by the action of *x* rays. But is this exclusion logical? The vast majority of radiographs are taken with the aid of intensifying screens, and it is the fluorescent light produced by the influence of *x* rays on these screens which plays a much greater part in the formation of the negative image than does the small percentage of *x*-ray energy absorbed by the film.—I am, etc.,

Guildford. C. J. CHESTERFIELD COOKE.

Scientific Method

SIR,—Dr. Piney in his letter to the *Journal* of Nov. 11 has produced a small masterpiece of misrepresentation of the scientific method. It is, he says, a "nostrum," but nevertheless he patronizingly admits that it is good. His crowning absurdity is to refer to the scientific method as authoritarian—a view which he bases on an obvious equivocation on the word "ordered" as distinct from his own interpretation of "orderly."

I am grateful, however, to Dr. Piney for two things. One is for a hearty laugh—the immediate response to his letter—not to be despised these days. The other is for an increased insight into the need for more general elementary teaching on the place and value of the scientific method in our culture. Let me suggest that Dr. Piney adds a smattering of scientific method to the smattering of the various sciences he claims to have achieved.—I am, etc.,

London, W.1. FREDERICK DILLON.

Smoking and Duodenal Ulcer

SIR,—The article on perforated peptic ulcer and your leader on the rise in peptic ulcer (Nov. 18, pp. 655 and 665) are of enormous interest. My own interest dates from my return to England after 22 years of foreign service, when I had the good fortune to be allowed to take duty in a medical outpatient department when the physician was away. Students tackled me at once as to the aetiology of duodenal ulcer, and I had to say I did not know; but I remembered that duodenal ulcer was a very rare condition in my house-physician days, so I looked for any condition or factor that from rarity had become common in the period of my foreign service. Drink was no longer found to prevail as a cause of disease as it had been in my student days, and the one item I could find was the cigarette habit, which, from small beginnings in the South African War, had grown and multiplied since, and which nowadays is, in spite of taxation, almost universal. Lord Moynihan was reported to have advised his duodenal ulcer patients not to resume smoking unless they

wished their symptoms to recur. Sir Arthur Hurst wrote to the *Times* to call attention to his opinion that "excessive smoking is undoubtedly one of the most important causes of unexpectedly high incidence of duodenal ulcer." He also mentioned that Sir Maurice Cassidy had drawn attention to the same subject. My own experience is very small, but one patient told me that he could always get sick leave by smoking cigarettes for a week or two before his medical board.

In the articles referred to above no mention is made of tobacco, but with such authority supporting the suggestion that tobacco is of very great importance in the aetiology of duodenal ulcer I venture to hope that cigarette smoking may receive attention, while the psychological and nutritional causes are also investigated. I would like to relate that several years ago I asked a sympathetic medical friend why no one with a voice that would be heard and listened to had not raised this point. His answer was cynical: "Not likely, all Harley Street has its money in Imperial Tobaccos."—I am, etc.,

Newbury. V. S. HODSON.

The Metric System and Medicine

SIR,—Few medical men, if they give any serious thought to it, can doubt the advantages to be derived from the use of the metric system in medicine. At present it is used by a small minority of the profession, and this surely leads to confusion rather than simplification. Indeed, those who use it are still after many years using it either inconsistently or incompletely. One sees Gilbertian instances of this from time to time in certain wards. Aperients may be ordered in the metric system, but if they do not have the desired effect an enema is given, and being measured, always I believe, in good old-fashioned pints and ounces, it usually has a most gratifying result. I well remember looking at the chart of a patient who drank in cubic centimetres but vomited in ounces (the stomach is a true British die-hard). Even physicians who are most enthusiastic supporters and users of the metric system still speak of their patient's temperature in degrees Fahrenheit.

I agree with Surg. Capt. Lambert Rogers (Nov. 11, p. 639) that if we should make up our minds to change to the metric system it should be done overnight. But it must be after careful consideration and preparation and by the whole of the medical and nursing professions as well as by all pharmaceutical personnel. But even then some may say, and possibly rightly, that this is unwise so long as Britain does not adopt the metric system for everything.—I am, etc.,

London, W.1. JOHN HOSFORD.

Débridement

SIR,—In teaching students and in other connexions I use the word "toilet" for the above. To students it has to be explained fully.—I am, etc.,

Cardiff. A. W. SHEEN.

R.M.B.F. Christmas Gifts

SIR,—You very kindly published my appeal in October on behalf of the Christmas Gifts Fund of the Royal Medical Benevolent Fund. I am very grateful to those who have already forwarded their contributions, but may I ask those of your readers who are in sympathy with our work and who have not as yet sent their donations to forward them as soon as possible to the Honorary Treasurer, Royal Medical Benevolent Fund, 1, Balliol House, Manor Fields, Putney, London, S.W.15, marked "Christmas Gifts." This appeal is urgent as we have not as yet received the sum required to meet the distribution of gifts.—I am, etc.,

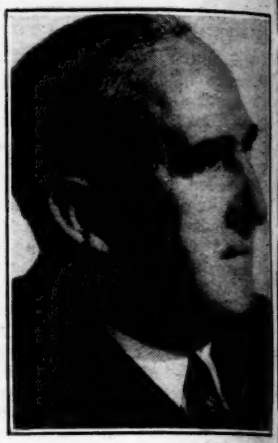
THOS. BARLOW,
President.

G. S. Erwin (*Tubercle*, 1944, **25**, 35) records 14 cases of tuberculous tracheo-bronchitis in adults aged from 19 to 64. Factors contributing to the onset were fatigue, malnutrition, fevers, and silicosis. The cardinal symptoms and signs were cough, sputum, evening pyrexia, haemoptysis, pain in the chest, and loss of weight. *X*-ray examination showed no evidence of acute parenchymal disease, though occasional hilar adenitis of the type seen in childhood is found. Treatment ranges from a quiet holiday to a stay in a sanatorium.

Obituary

SIR ROBERT KELLY, C.B., F.R.C.S.

Sir Robert Ernest Kelly died at his home in Liverpool on November 16 at the age of 65. As a vice-president and member of the Council of the Royal College of Surgeons, a member of the General Medical Council, and a member of the Army Medical Advisory Board, regional consulting surgeon and chairman of the Local Medical War Committee, there was much for him to do in these troubled times. A man of peace, with a deep love of his country, he would be found giving a hand wherever the city had been "blitzed." His loss will be felt deeply by those who appreciated his kind disposition, engaging perseverance, and the wholehearted enthusiasm to advance the art and science of surgery. He belonged to a rapidly diminishing group of craftsmen, who with ease turn from one branch of surgery to another and perform cranial, abdominal, vascular, and orthopaedic operations with admirable skill and success.



Born in 1879, he was educated at the Liverpool Institute. He took the B.Sc.Victoria, and was one of the first graduates of the University of Liverpool. His early training in physiology and association with Sherrington undoubtedly influenced his subsequent career, bringing with it a remarkable delicacy in the handling of tissues and a keen desire to further research. His research was objective and had the safety of the patient ever in view. An exponent of the open method of administering ether, he introduced the intratracheal method into this country following upon a visit to America.

The outbreak of the last war interrupted his career as assistant surgeon to the Liverpool Royal Infirmary. He went to Salonika, there to make Thomas splints and start rehabilitation centres. He became consulting surgeon to the British Salonika Force and was awarded the C.B. Shortly after his return he was appointed professor of surgery. His lectures were popular and practical and well illustrated, for his hobbies included colour photography in all its forms, in addition to golf and the 'cello. In 1937 he had the honour to be invited to take charge of the Surgical Unit at St. Bartholomew's Hospital for a period of one month.

Keenly alive to the changed circumstances under which the teaching hospitals were working, Robert Kelly urged a fusion of local hospitals to build one worthy of the city—the foundation stones of which he would have welcomed. Twice President of the Liverpool Medical Institution, he conducted its centenary proceedings in a manner worthy of the best tradition of that society. He could be relied upon to give all organizations interested in medical welfare his closest support. He received a well-deserved knighthood in 1939, and was appointed emeritus professor of surgery and honorary consulting surgeon to the Royal Infirmary. He leaves a widow and one daughter.

Prof. HENRY COHEN writes:

It is hard in the immanence of his passing to write soberly of Robert Kelly. Twenty-five years ago he was my teacher, and for nearly twenty years my surgical colleague. With the years the admiration of the student grew into the love of a friend for a gentle and unassuming personality, devoid of malice and guile, with never-failing tenderness and courtesy. His junior colleagues sought him out in their troubles and perplexities, and he was never too busy to give them encouragement and sympathy. Not Liverpool only but all British surgery is the poorer for his loss.

His career was one of unbroken success. He early recognized that an understanding of bodily function is no less significant to the surgeon than a knowledge of anatomy, so he interrupted his medical course to take an honours degree in physiology under Sherrington.

who was then at Liverpool laying the foundations of modern neurophysiology. One of the greatest of ancient lyricists wrote, "Principibus placuisse viris non ultima laus est"; if Horace did not err Kelly must have been a happy man when Sherrington testified in 1921 that "during my eighteen years at the University of Liverpool I never had a student of greater promise." Physiological principles permeated his surgical teaching and practice throughout, but did not prevent him from becoming a superb craftsman. His manual dexterity was proverbial, and with the simple tools of his work he was an acknowledged master; even in the tying of a knot he showed a consummate artistry. But he delighted especially in the mechanically ingenious instrument; many of his students spent laborious hours providing the motive power for a hand-driven de Martel's trephine, but they were rewarded by those eyes which shone in admiration whenever, with almost human prescience, the drill stopped at the dura. The skill with which he used Souttar's craniotome may be seen in a film, contributed to the Kodak Library, on the removal of a cerebral tuberculoma. His enthusiasm for intratracheal anaesthesia, which he introduced into this country after a visit to America in 1912, owed not a little to his admiration for the physical principles of the apparatus. His zest for new adventures in surgery never flagged. In his sixtieth year his keenness and enthusiasm would put to shame the complacency and contentment of many surgeons twenty years his junior. His surgical versatility and knowledge were outstanding; except for chest surgery, there was no branch of the art in which he would not have been regarded as a peer by those with narrower interests.

But his skill never outstripped his judgment. Nor did he fall a victim to the many conditioned reflexes of the surgery of his time. For him "peptic ulcer" was not a specific stimulus, with surgery as an inevitable response. Few surgeons realized earlier than he the impermanence of surgery in that ultimately unrewarding Platonic absolute—the "chronic appendix." By instinct and persuasion he was a true physician ever seeking to understand the workings of Nature, and never so arrogant as to believe that his plumbing, carpentry, or architecture were more than minor contributions to the processes of healing and repair.

He wrote little by which he will be remembered, but his example and influence have left something in the structure of surgery more durable than his own brief life. For he was a model teacher. Even his systematic lectures had the intimacy of the wards. His style was simple and direct. He lacked (or did he shun?) the felicitous phrase and polished period of the seasoned orator, but his teaching was no less effective and his apt similes and illustrations had more than local fame. His students will recall vividly the annually produced orange with which he demonstrated the sites of cleavage in compression fractures of the skull, and the stick of chalk which illustrated the mode of production and the difficulties of reduction of spiral fractures of the tibia. He was no mean artist, and his lucid line drawings made with the traditional multicoloured pencil, which his senior colleague Thelwall Thomas (to whose encouragement and training Kelly never failed to pay affectionate tribute) had introduced, were a regular feature of his demonstrations.

From the day of his appointment as professor of surgery in the University of Liverpool he threw himself whole-heartedly and with great energy into its academic life and into the medical life of the city. Not only here, but in the wider spheres of his college, the General Medical Council, and those Government Departments with which he was associated in an advisory capacity, he revealed qualities of statesmanship which did not surprise those who knew his original and reflective mind. His unexpected gifts as an administrator were unmasked when, as consulting surgeon to the Salonika Army, he "controlled the surgical work and supervised the surgeons working in at one time as many as 21,000 hospital beds." There his "services were of the greatest value," and earned for him the highest praise from the Director of Medical Services, Major-Gen. M. P. Holt. A revealing comment on Kelly is that during the Salonika campaign his chief recreation lay in reading Bayliss's *Principles of General Physiology*.

His tact and the belief of his colleagues in his complete integrity and selflessness were major assets in the delicate negotiations which led to the formation of the Associated Voluntary Hospitals Board in Liverpool, and later to the conception and legal realization of the union of the four general teaching hospitals in Liverpool as the Royal Liverpool United Hospitals. In committee his sense of justice and his intuitive understanding of people and things made him an accepted leader; he never dominated, his sole aim was to help. He did not feign disinterestedness in the rewards of his professional labours. Each fresh honour—and few open to the surgeon were denied him—cheered and heartened him; but he gave his energies and laboured unstintingly in many fields which yield no laurels. His knighthood, conferred on his retirement from the chair of surgery, was a recognition of the spirit and example of a tenure during which many who now hold high places in the world of medicine came under the spell of his inspiration and magnetic personality.

Kelly's interests were not confined to medicine. He was a man of wide culture and diverse facets. He loved art and music. He was a competent 'cellist, and though he rarely missed a philharmonic concert, he preferred the more intimate charm of chamber music. The theatre was one of his many hobbies; colour photography, both still and kinematic, another. He was a supporter of the Liverpool Playhouse, and not the least attraction of his frequent visits to London on official business was the opportunity of a night at the theatre. He played golf, but his captaincy of the Wallasey Golf Club mirrored the affection in which he was held rather than his prowess on the links. But his main recreation was reading. He read widely, not only in the literature of medicine, but in history, biography, travel, and especially modern science. The more popular works of Einstein, Rutherford, Bragg, Eddington, Jeans, Aston, Dingle, and other modern physicists were his mental stimulants when a long operation list had earned an evening's physical relaxation.

The sorrow of his loss was shown by the large and distinguished congregation representing his many scenes of endeavour which gathered to pay its tribute at the Liverpool Cathedral. Few men have by their lives more cogently compelled the epitaph: *Nihil quod tetigit non ornavit*.

E. W. HEY GROVES, F.R.C.S.

Prof. G. GREY TURNER writes:

Your admirable notice of my old friend Hey Groves may be supplemented by mentioning that in 1916 he obtained the Jacksonian Prize at the Royal College of Surgeons for an essay on "The Methods and Results of Transplantation of Bone."* At that time he was already attracted to bone surgery and had done much experimental work on the subject, but I think he was greatly encouraged by the award, and it had much to do with finally focusing his attention on bones and joints. Nevertheless, he remained a general surgeon, and almost the last time I saw him at work in Bristol, in April of 1939, he showed some cases in which he had transplanted the ureter, and in one of these he proposed to do a further operation for exploration of the kidney on the following day. More years ago than I care to mention Hey Groves rather startled a London audience at the Royal Medico-Chirugical Society by a paper on gastrectomy, in which he advocated removal of the great omentum when that operation was carried out for malignant disease. During the last war one of his activities was the splint factory which he set up in Alexandria and supervised up to the time he left Egypt. It was wonderful to see the Arab workmen turning out splints in large numbers, mostly to patterns devised by Hey Groves. As long as he was there to supervise things all went well, and I shall ever feel grateful for the demonstration he gave us on gunshot limb injuries in the wards of the 21st General Hospital. But apart from the technical side of his work Hey Groves was a delightful personality. He loved foreign travel, and I think probably got more enjoyment out of our many tours on the Continent than most people. At the meetings of the editorial committee of the *British Journal of Surgery* Groves was usually in his best form, and except for the wartime (1914–18) I remember his being absent on one occasion only, and that was in consequence of illness. He and Moynihan, who was chairman of the *Journal* until his death, made a very good combination, but I always felt that Groves did not get quite enough credit for the enormous amount of tedious editorial work he undertook without the slightest complaint. He was always ready to shoulder more; and if ever there was difficulty in deciding who should review some book, often in a foreign language, he was willing to step into the breach.

FRANK ARTHUR HEPWORTH, F.R.C.S., died at his home in Saffron Walden, Essex, on Nov. 5, after a long illness, at the age of 65. He received his medical education at St. John's College, Cambridge, graduating B.A. (1st Class Natural Sciences Tripos) in 1900, and at St. Bartholomew's Hospital, taking the M.A., M.B., and B.Ch. in 1904, and F.R.C.S.Eng. in 1907. During the last war he served in the R.A.M.C. with the rank of major, and was appointed senior resident surgeon at Wharncliffe, and later at the County of Middlesex War Hospital. For his services he received the O.B.E. In 1919 he came to Saffron Walden to take up general practice. He was elected to the staff of the hospital in 1920, and in 1940 he became senior surgeon, a post he held until his death. In the years that I have known Hepworth as a neighbouring practitioner I have always been struck with the quite remarkable devotion and affection that his patients felt for him. He was a good deal more than the family doctor to them. They brought him all their troubles, for they knew that he would apply himself to their problems in that thorough and painstaking way that was his particular characteristic. One may say that he did too much for his patients, for it was this excessive devotion to his work that finally undermined his health. As a colleague I shall always remember with gratitude his unfailing readiness to help at operation or in consultation, however awkward the hour or however tired he may have been.

* Subsequently published in the *British Journal of Surgery*, vol. 5, p. 185.

Although he chose to remain in the ranks of the general practitioners, he was a surgeon of great competence. His judgment was sound and his knowledge very wide, for he somehow found time for extensive reading. This and his vast experience in general practice made him a mine of information to anyone needing his help, and in particular to his fellow practitioners at the hospital. He died in middle life, while still at the height of his powers. The name of Dr. Hepworth will be long remembered in Saffron Walden and in the surrounding villages, for he was one who combined in his personality the finest qualities of the traditional family practitioner with the progressive and scientific outlook of to-day.—A. G. S.

Dr. JAMES J. PATERSON, late medical officer of health for East Berkshire, died from illness in Italy on Oct. 24; he had been appointed to U.N.R.R.A. in June. He studied at the Cardiff Medical School, where he won a scholarship, and entered St. Bartholomew's Hospital as senior science scholar, graduating B.Sc.Lond. in 1903, M.B., B.S. in 1908, and M.D. in State Medicine in 1911. At Bart's he was for a time junior demonstrator in physiology. He entered the public health service as assistant R.M.O. to the Croydon Borough Hospital, then became assistant M.O.H. to the county borough of St. Helens, and moved to Maidenhead in 1911 as M.O.H. for the East Berks United Sanitary Districts, school medical officer for the borough of Maidenhead, and superintendent of the infectious diseases hospital. Dr. Paterson joined the B.M.A. in 1909, was honorary secretary of the Section of Public Health at the Annual Meeting of 1922, and chairman of the Windsor Division in 1928–9. A. T. writes: By the sudden and untimely death of Dr. J. J. Paterson, U.N.R.R.A. has lost an extremely valuable member of its medical staff. Everyone interested in public health work, particularly in its international aspects, knows how much he did to develop and foster it. The conclusion of his long and successful tenure of the post of M.O.H. to East Berkshire would have seemed to most men a fitting moment to retire from active work. Paterson, however, thought otherwise, and was one of the first to volunteer to work on Balkan relief. He survived a strenuous summer in refugee camps in the Middle East, and it was just as he was on the point of leaving Italy for Yugoslavia that he collapsed and died. Ten minutes before his death he had been busily engaged in discussing plans with the other members of the Mission, and seemed as bright and efficient as ever. He died, as he had lived, in harness, and those who knew him are satisfied that he would not have wished it otherwise. Our sympathy goes out to his widow, who, sharing his humanitarian views as she did, gladly spared him for the work on which his heart was set.

The following well-known medical men have recently died: Dr. LAWRENCE JOSEPH RHEA, professor of pathology at McGill University Faculty of Medicine, aged 67; and Dr. FREDERIC ATWOOD BESLEY, a founder member of the American College of Surgeons, aged 76.

Universities and Colleges

UNIVERSITY OF LONDON

The following candidates have been approved at the examination indicated:

THIRD M.B., B.S.: [1] [2] R. Harrison, [1] [2] Margaret E. Hughes, J. C. L. Adams, J. Andrew, E. M. Backett, E. W. Ball, J. A. Barlas, D. W. Barritt, R. G. Bird, J. A. H. Brown, Barbara G. Bull, A. Butterworth, R. D. Calcott, C. M. Carlyle-Gall, H. E. Claremont, A. A. Cochrane, G. N. C. Crawford, R. Creese, J. S. Crowther, R. H. Cutforth, Joan M. B. Davies, J. W. T. Dixon, M. H. N. Dixon, F. G. Domaingue, R. L. M. Ferrari, Barbara W. Gerrard, Muriel M. Gloster, L. W. Godfrey, Susanna Gordon, I. G. Gray, N. H. Gunn, P. J. Hare, H. F. Hills, G. N. Jones, Mary D. G. Jones, Barbara Law, D. Lawrence, G. L. Le Bouvier, T. P. Loke, D. R. Lucas, P. F. M. MacDonagh, I. Macdonald, R. I. Meanock, J. B. Mehta, R. Milton, G. Monckton, R. E. Moore, J. A. Oddie, B. W. Orchard, K. Owen, K. W. E. Paine, H. W. Palmer, A. Persey, R. G. Pitman, A. H. Pote, A. G. Quinlan, K. J. Randall, Elizabeth V. Rohr, C. D. Routh, P. J. L. Sequeira, K. E. D. Shuttleworth, L. S. Simons, J. A. Sindell, C. H. Smith, W. H. R. Smith, Y. G. Sofer, Zena Stanley, S. J. Steel, B. S. Sweetman, J. M. Tanner, R. C. W. Thompson, Mary Townsend, D. Q. Trounce, C. H. Walker, Muried C. Waterfall, Jean M. Watson, P. West, D. R. Wilkie, P. A. T. Wood, E. A. Wright, Betty C. Zoob, M. Zoob.

[1] With honours. [2] Distinction in obstetrics and gynaecology.

SOCIETY OF APOTHECARIES OF LONDON

At a recent meeting of the Court of Assistants, with Dr. J. P. Hedley, Master, presiding, an illuminated address was presented to Sir Stanley Woodwark upon the completion of three years as Master of the Society. Surg. Rear-Admi. C. P. G. Wakeley delivered a lecture in the hall on "War Surgery in 1944" in place of Col. Elliott Cutler, who was unable to lecture owing to military duties.

The diploma of the Society was granted M. J. Blunt, D. A. Cox, D. I. T. Edwards, E. D. C. Jones, R. A. Leeming, I. A. Nazroo, D. T. H. Paine, E. F. Roberts; and the diploma of Mastery of Midwifery to J. N. I. Emblin, A. Rothbaum, J. W. H. Simpson.

Medical Notes in Parliament

Tuberculosis and Health Services in Nigeria

In a reply on Nov. 8 Col. STANLEY reported that detailed statistics of the incidence of tuberculosis in Nigeria as a whole were not available, but the position gave cause for concern. Facilities for the treatment of tuberculosis, and indeed medical facilities as a whole, obviously needed to be widely extended, but the expansion of the activities of the medical department had inevitably been limited during the war by the staff shortage. This had been accentuated by releases for military service, by invalidings, and by recruitment difficulties. In Nigeria as an essential preliminary towards preparing a comprehensive tuberculosis prevention scheme the Nigerian Government made provision for the establishment of a Tuberculosis Investigation and Survey Unit under the charge of a tuberculosis officer. The unit would include a mobile mass radiography section. The survey would start as soon as staff and equipment could be obtained. When these had been completed it would be possible to prepare for the needs of the country as a whole. Steps were also being taken to appoint a venereologist to take charge of a campaign against venereal disease. Venereal disease clinics would be opened in Lagos and elsewhere as soon as facilities were available. Meanwhile treatment for tuberculosis, venereal disease, and pneumonia was available to the public at existing hospitals and clinics. Expansion of general medical facilities would form an important part of the post-war development programme for Nigeria.

In one part of his reply Col. Stanley said that Government medical officers in Nigeria provided their own transport, but were eligible for assistance in the form of an advance of salary towards the purchase of motor vehicles. Maintenance and mileage allowances were paid. He was not aware of any difficulties.

Industrial Injury Insurance

Sir DAVID MAXWELL-FYFE resumed the debate on Nov. 9. He said there was an absence from the present system of provisions for medical and post-medical rehabilitation. All agreed that must be changed. The present scheme proposed grants for maintenance in hospitals, treatment, and constant attendance. Medical treatment and rehabilitation of the injured workman and post-war rehabilitation and training would be provided as part of the general medical and post-hospital rehabilitation services organized by the Ministry of Health and the Ministry of Labour. There would be a duty on the Ministry of Social Insurance to co-ordinate these activities with those of the Department, to assure free information, and to see the best services were provided for rehabilitation and training. The House had seen light work used as a method of stopping compensation. That was wrong and destroyed what work could do to restore and rehabilitate. The Government's proposals eliminated the idea of deciding how far a workman had recovered his earning capacity. They eliminated the grievance that an increase in earning capacity resulted in an automatic reduction in pension. Many M.P.s had seen the mental harm which that system caused in the past. The proposals also removed the suspicion that the workman would be pressed to undertake unsuitable work, with the result that he hesitated about rehabilitation and his recovery was retarded. The Government system gave a workman a right to his pension whatever work he did. It also met to some extent the complaint that there was no compensation for mutilation and disfigurement except in strict relation to earning capacity. By the system proposed, the workman would notify the pensions officer of the accident and would send the certificate of the doctor who had examined him for the injury. There would be confirmation from the employer, or, if there was a dispute, an appeal to the local appeal tribunal. When the Bill was drafted the Government would bear in mind the allocation of onus of proof. Clear working instructions would cover the vast majority of cases. When the change came from allowance to pension the question of disability would go to a medical board, against whose decision there could be an appeal to the local appeal tribunal, with the same chairman but with medical instead of ordinary members. That procedure would get rid of one-man decisions by a medical referee as was now done under Section 19 of the Act. He suggested that the words "arising out of and in the course of" employment should be retained when drafting the new Bill. Interpretation of those words had changed in favour of the workman.

Mr. BOWLES cited the case of a workman who had twice got dermatitis at a factory when unloading machinery which arrived covered with oil. This man had great difficulty in

getting doctors to certify that the dermatitis had been caused by his employment.

Dr. MORGAN said he viewed the scheme with misgiving. He knew no more damaging evidence against medical tuition than was found in the Workmen's Compensation Acts. He had seen doctors and specialists go into the witness-box and make mendacious statements against the workmen. He had wondered where the General Medical Council was and why some of these witnesses were not struck off the *Register*. Doctors had not, in the past, been taught anything about the assessment of injury. They had to make assessments without knowing the nature of the occupation. There was no lectureship on industrial diseases in this country. Under the scheme the employers would have no urge for prevention. Take the case of the nurse. If she went to a sanatorium and got tuberculosis she could not get compensation because tuberculosis was not in the list of scheduled diseases. The same applied to scarlet fever. The only remedy for the nurse was to fight a common law action. Sir Thomas Legge had advocated the abolition of the test that a disease must be proved to be specific to the employment before it could be accepted for the Schedule. Nothing had been done. Chronic carbon-monoxide poisoning was scheduled in Australia but not in Great Britain. Vibrational diseases contracted in boot factories and road repairing were scheduled in Germany but not in Britain. Nothing in these matters was changed under the Government scheme.

Mr. PEAKE said that if the nation was to have a separate industrial scheme with special rates of benefit higher than that laid down in the general scheme, there must be a clear line of demarcation between an industrial accident and misfortunes giving entitlement to sickness benefit. The Government was prepared to consider any good alternative to the words "arising out of and in the course of the employment." He did not think the words "attributable to or aggravated by" were appropriate for industry.

The House then carried without a division the motion welcoming the Government intention to proceed with the new scheme of Industrial Injury Insurance.

Ministry of Social Insurance : Sickness Benefits

Mr. ATTLEE moved on Nov. 11 the second reading of the Social Insurance Bill. He said the Bill was designed to transfer to a single Ministry of Social Insurance powers now divided between the Minister of Health, the Secretary of State for Scotland, the Minister of Labour, and the Home Secretary. These powers were contained in the Acts of Parliament and many regulations. The appointment of this Minister and transfer of powers would enable the new scheme to be brought more quickly into legislative form. The Minister would have the task of framing legislation and working out administrative changes and would have at his disposal the trained staff now dispersed between various Departments. Clause 6 of the Bill laid down the powers and duties hitherto belonging to other Ministers which were to be transferred by Order in Council. Provision of medical benefits remained with the Minister of Health.

Mr. GREENWOOD said the social insurance scheme was not merely a scheme for co-ordinating the payment of insurance benefits. Behind the scheme was a close association of constructive treatment with payment of benefits.

Col. ELLIOT said that on the divorce of the handling of insurance finance from the payment of health benefit the Bill was obscure. The ideal of associating rehabilitation with health insurance had never properly been carried out. The Ministry of Health Act had torn medical research from the insurance scheme and put it under the Lord President of the Council. He understood there was no proposal that it should be integrated again. By an Order in Council under the new Bill powers could be taken away from the insurance authority in Scotland and concentrated in London. Lord Addison once acclaimed the uniting of health insurance with local government and housing. Now a cry of delight went up at their separation. Col. Elliot saw no reason why the Chief Medical Officer of Health should not be found a further place in the proposed legislation. Sir Wilson Jameson had lately said that there was no means of assessing the day-to-day health of over 40,000,000 people. But he was getting medical certificates daily about millions of those people. Proper use had never been made of those certificates, and the Bill, if anything, would push them further into pigeon-holes.

Sir DAVID MAXWELL-FYFE said the Government desired that there should be co-operation and co-ordination between the Ministry of Social Security and the other Departments which would work, for example, the rehabilitation proposals. What Col. Elliot had said about regional devolution would receive the attention of the Government. For the National Health Service the Minister of Health would continue to be responsible. Provision of its benefits must lie within his purview. Services in kind came under the Minister of Health; services in cash would be transferred to the Ministry of Social Insurance. The Ministry of Health must keep control and administration of medical services.

The Bill was read a second time without a division.

Demobilization of Doctors

Mr. ERNEST BEVIN announced on Nov. 15, when replying to a debate on release from the Forces, which had been opened by Col. Profumo, that doctors and dentists would be released from the Forces by age and length of service, in accordance with the general scheme. Mr. Bevin asserted that after the 1918 election such political pressure was used to get individuals from the Forces out of their turn on the plea of being specialists that the whole demobilization scheme broke down. The Ministry of Labour must examine the figures of what they would get released under Class A before it began pressing for any special people. With regard to the universities a large number would come back under Class A. The Government would then have to see what number was necessary to supplement them. The further educational training scheme would give a person in the profession a chance to take courses to make good the break in his training.

Dr. HADEN GUEST said weight should be given to the wounds a man had suffered, the illnesses which he had suffered, and any changes in his medical category. In Burma the admissions to hospital, for the most part for serious tropical diseases, increased by 100% in the year. These things should be considered, in relation to the theatre of war in which the man had been, when deciding time and priority of demobilization. Dr. Guest said he did not know how the Government was going to release a large number of doctors. It had not the doctors. The proportion of doctors engaged in the Services was larger than the proportion of miners or of building workers. There were not, in fact, enough other doctors to release them according to age and on the lines laid down in the White Paper. Unless plans were being made for the more rapid bringing forward of new doctors and for obtaining others for the civil population of this country Parliament would not be able to tackle the question of Forces doctors as it should be tackled.

Domestic Staffs of London Hospitals

In a reply on Nov. 16 to Mr. Keeling, Mr. BEVIN said he knew of the shortage of staff in the London hospitals. During the period of the heavy "flying-bomb" attacks the London hospitals evacuated a large number of their patients and their staff demands were much reduced. In the last two months these demands, enlarged by the need to replace excessive wastage consequent upon the dislocation caused by the bombing, again became urgent. This coincided with the need to provide domestic staff for the hostels for building workers brought into London to repair bomb-damaged houses, a measure pressed from all quarters as one demanding the highest priority. Some 3,400 domestic workers had been found for these hostels. Even during this exceptionally difficult period the hospitals were not neglected. In the past two months 63 cooks, 756 full-time and 115 part-time domestic workers, and 163 orderlies, porters, stokers, and maintenance men were placed. Of 62 domestic vacancies notified from Aug. 23 to Nov. 7, 51 applicants had been submitted and 44 placed. Further demands had since been received. Now that the staffing of the building workers' hostels was almost completed it should be possible to make further progress in meeting the demands of hospitals. These would enjoy first priority for the supply of domestic labour. Mr. Bevin appealed to the voluntary hospitals in London to introduce more up-to-date personnel management. He said he would be helped if their staffing measures were not so antiquated. He added that in regard to cooks and staff there was first priority for hospitals all over the country.

Charge for Certificates.—On Oct. 31 Mr. ROBERT MORRISON asked the Minister of Health by what authority doctors charged their panel patients a fee of 1s. for signing their certificates for priority milk and eggs. Mr. WILLINK replied that insurance medical practitioners were required to give medical certificates only for the purpose of the National Health Insurance Acts. They were not forbidden to give and charge for certificates required for other purposes.

Antimalaria Tablets for S.E.A.C.—Asked on Nov. 7 whether antimalaria tablets and water-sterilizing powder were now available to all ranks who were in need of them in S.E.A.C., Sir JAMES GRIGG said these preparations were supplied to South-East Asia Command by India, and so far as he knew all demands had been met.

Notes in Brief

Mr. Ernest Bevin, on Nov. 2, told Dr. Russell Thomas that he was unable to state his intentions on the demobilization of students who had not completed their professional examinations.

The Services

Capts. L. J. Calvert, D. G. Cameron, C. B. Caswell, and R. C. Mellow, R.C.A.M.C., have been awarded the M.C., and Major (Temp. Lieut.-Col.) E. J. Selby, O.B.E., R.A.M.C., has been mentioned in dispatches in recognition of gallant and distinguished services in Italy.

Capt. S. Gopalakrishnan, Lieut. (Temp. Capt.) C. J. Pinto, Lieut. (Acting Capt.) C. S. Rao, and Subadar H. M. Yaqub, I.A.M.C., have been awarded the M.C. in recognition of gallant and distinguished services in Burma.

Capt. J. P. Irwin, R.A.M.C., has been mentioned in dispatches in recognition of gallant and distinguished services in the field.

The Efficiency Decoration of the Territorial Army has been conferred upon Col. R. I. Poston, Lieut.-Col. (Temp. Col.) J. P. J. Jenkins, Lieut.-Col. (Acting Col.) I. G. W. Hill, and Majors (Temp. Lieut.-Cols.) N. Capstaff, W. M. Evans, M.C., A. J. King, and H. S. Ward, O.B.E., R.A.M.C.

CASUALTIES IN THE MEDICAL SERVICES

Killed in Western Europe.—Lieut. David Michael de Reuda Winser, M.C., R.A.M.C.

Died.—War Subs. Capt. Ian William Barclay, R.A.M.C.

Died of wounds.—Capt. Philip Augustus Robinson, R.A.M.C.

Wounded.—War Subs. Capts. A. Anderson, T. G. Gray, D. R. Hughes, G. P. Mitchell, and H. B. S. Warren, R.A.M.C.

Wounded or injured.—Temp. Surg. Lieuts. R. C. Carr, J. P. W. Grant, B. H. Hand, and E. V. Mackay, R.N.V.R.

Missing, presumed killed.—Temp. Surg. Lieut. Horace Edward Dunning Gale, R.N.V.R.

Missing presumed lost from Japanese transport.—Capt. Matthew Joseph McNamara, A.A.M.C.

Reported missing, now prisoner of war.—Major T. R. B. Courtney, R.A.M.C.

Previously reported missing at Arnhem, now known to be a prisoner of war.—Capt. R. E. Bonham Carter, R.A.M.C.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* there was a general increase in the notifications of infectious diseases. There were 925 more cases of measles than last week, 162 more of whooping-cough, 64 more of dysentery, and 63 more of acute pneumonia.

The rises in whooping-cough and acute pneumonia notifications were greatest in Lancashire, 88 and 35 respectively more than last week, and this county had the greatest fall—47 fewer cases—in scarlet fever. Notifications of diphtheria fell by 24 in Cheshire, and by 13 in Lancashire, but rose in Staffordshire by 12, and in Warwickshire by 14.

Measles is still rising in incidence in the north. Increases over last week's totals were as follows: Lancashire 450, Warwickshire 218, Staffordshire 92, Southampton 51; the only drop of any size was in Devonshire, where 73 fewer cases occurred. Lancashire had 36% of the measles notifications for the country. The 2,055 cases recorded made the largest weekly total in the country since the end of 1942, when 2,096 cases were notified, this number being only 14% of the total for the country.

The notifications of dysentery rose to 320. The principal centres of infection remain unchanged. The largest returns were London 64 (Wandsworth 29); Lancashire 57 (Prestwich M.B. 17, Prescot 15); Middlesex 27 (Sunbury-on-Thames U.D. 20); Glamorganshire 19 (Cardiff C.B. 17); Essex 17; Gloucestershire 14; Cheshire 12.

In *Scotland* notifications for acute primary pneumonia rose by 42, measles by 38, diphtheria by 29, and dysentery by 10. Glasgow had 11 more cases of dysentery than last week, and Aberdeen County 8.

In *Eire* the incidence of measles again fell, only 11 cases being reported. The incidence of diphtheria remained unchanged at the relatively high level of 123.

In *Northern Ireland* the most notable feature of the returns was the increase of 62 in the notifications of measles; 200 cases were reported in Belfast C.B. during the week.

Week Ending November 18

The returns of infectious diseases in England and Wales during the week included: scarlet fever 2,335, whooping-cough 1,410, diphtheria 619, measles 6,001, acute pneumonia 626, cerebrospinal fever 45, dysentery 217, paratyphoid 18, typhoid 7, acute poliomyelitis 12.

No. 45

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Nov. 11.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1944 (a)	(b)	(c)	(d)	(e)	1943 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	37	3	12	3	—	41	4	24	2	1
Deaths		—	1				—	—		
Diphtheria	642	14	198	123	26	819	50	181	117	48
Deaths	12	—	5	4	—	13	1	3	5	—
Dysentery	320	64	100	—	—	158	35	87	—	—
Deaths				—	—	—			—	—
Encephalitis lethargica, acute	1	—	2	—	—	1	—	—	1	—
Deaths		—					—			
Erysipelas			41	15	2			53	5	1
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				35					20	
Deaths	41	3	14	13	1	64	7	11	15	2
Measles*	5,752	57	345	11	207	557	50	67	56	2
Deaths	6	—	—	—	—	—	—	—	—	—
Ophthalmia neonatorum	66	4	14	1	—	89	6	22	—	—
Deaths										
Paratyphoid fever	3	—	1 (B)	—	—	4	—	—	—	—
Deaths	—	—	—	—	—	—	—	—	—	—
Pneumonia, influenzal†	583	30	9	3	7	781	48	45	—	7
Deaths (from influenza)	25	2	1	—	—	46	6	20	3	1
Pneumonia, primary			221	18				259	12	
Deaths		22		15	9		37		4	12
Polio-encephalitis, acute	2	1				2	—			
Deaths		—					—			
Poliomyelitis, acute	13	—	1	2	—	20	4	1	3	—
Deaths		—					—			
Puerperal fever		1	12		1		2	26	—	—
Deaths										
Puerperal pyrexia‡	161	2	13	2	1	158	7	11	—	4
Deaths		—					—			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	2,132	46	351	43	80	3,236	246	403	56	87
Deaths	1	—	1	—	—	1	—	—	—	—
Smallpox	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Typhoid fever	4	—	1	9	4	5	—	2	8	2
Deaths	2	—	—	1	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	1	—
Deaths			—	—	—				—	—
Whooping-cough*	1,297	34	97	16	13	1,902	174	220	21	24
Deaths	2	—	—	1	—	7	—	2	1	—
Deaths (0–1 year)	290	26	53	46	23	316	37	67	32	22
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	4,338	598	627	220	153	4,368	695	638	200	126
Annual death rate (per 1,000 persons living)			14·4	14·3	§			14·4	13·1	§
Live births	6,414	552	888	383	256	5,836	697	861	353	245
Annual rate per 1,000 persons living			18·1	24·8	§			17·6	23·2	§
Stillbirths	209	15	30			199	23	35		
Rate per 1,000 total births (including stillborn)			33					39		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

‡ Includes puerperal fever for England and Wales and Eire.

§ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Medical News

The Harben Lectures for 1944 will be given at the Royal Institute of Public Health and Hygiene, 28, Portland Place, W., by Sir Alexander Fleming, F.R.S., on "Penicillin—Its Discovery, Development, and its Uses in the Field of Medicine and Surgery," on Monday, Tuesday, and Wednesday, December 11, 12, and 13, at 3 p.m. Accommodation is provided for members and students of the medical profession and others interested in health problems. Those intending to be present are asked to notify the secretary of the Institute.

A short conference on "The Selection and Training of Personnel for Industry" will be held under the auspices of the London and Home Counties Branch of the Institute of Physics at 2 p.m. to-day (Saturday, Dec. 2) in the lecture theatre of the Royal Institution, Albemarle Street, W. Visitors will be welcome.

The Society of Public Analysts and Other Analytical Chemists has arranged a joint meeting with the Food Group of the Society of Chemical Industry to discuss methods of sampling foodstuffs for analysis. It will be held at 2.30 p.m. on Wednesday, Dec. 6, at the Chemical Society's Rooms, Burlington House, Piccadilly, W. The council welcomes the presence of guests introduced by members.

The Royal Institution announces a Friday evening discourse on Dec. 8 at 5 o'clock by Lieut.-Col. E. F. W. Mackenzie entitled "London's Water Supply: Safeguarding its Purity in Peace and War." Sir Henry Dale, M.D., P.R.S., will give a course of three lectures on "Modern Developments in Chemical Therapeutics" on Tuesdays, Dec. 5, 12, and 19, at 5.15 p.m.: (1) beginnings of chemotherapy; (2) recent advances in chemotherapy; (3) penicillin and antibiotics. Full particulars of the Royal Institution and its lectures may be had from the general secretary, 21, Albemarle Street, London, W.1.

The annual general meeting of the Anglo-Soviet Medical Council will be held on Friday, Dec. 8, at 4.30 p.m. at the Royal Society of Medicine, when it is hoped that the Soviet orthopaedic surgeon, Prof. Priorov, will address the meeting.

A Chadwick Lecture on "Food and its Adulteration during the Present War" will be given on Tuesday, Dec. 12, at 2.30 p.m., at the Royal Society of Tropical Medicine and Hygiene, 26, Portland Place, W., by Mr. George H. Walker, Ph.D., public analyst for the City of Salford.

Dr. R. C. B. Wall will deliver the Fitzpatrick Lectures on Tuesday, Dec. 12, and Thursday, Dec. 14, at the Royal College of Physicians, Pall Mall East, at 2.15 p.m. Subject: The History of the English Medical Profession: (1) the Sixteenth Century, (2) the Seventeenth Century.

The annual meeting of the British Orthopaedic Association will take place in London on Friday and Saturday, Dec. 15 and 16, under the presidency of Mr. St. J. D. Buxton. The first day's session will be at the Royal College of Surgeons, Lincoln's Inn Fields, and the second day's at Queen Mary's Hospital, Roehampton.

The conference on the nutritional role of the microflora in the alimentary tract, which was to have been held last July and had to be postponed, will take place on Saturday, Dec. 30, beginning at 11 a.m. Further details of the Nutrition Society can be obtained from the Hon. Secretary, Dr. Leslie J. Harris, Nutritional Laboratory, Milton Road, Cambridge.

Blood donations were made by more than 330,000 persons under the Ministry of Health Emergency Blood Transfusion Service during the first six months of this year. This was about 100,000 above the total of donors during the corresponding period of last year. Nearly a million names are now enrolled on the donor panels, an increase of about 100,000.

Dr. M. T. Morgan, *M.C.*, medical officer of health for the Port of London, has been seconded by the Corporation of London to work with U.N.R.R.A., and during his absence Dr. Arthur Davies, director of the Devonport Pathological Laboratory, has consented to act for him as consultant to the Ministry of War Transport on questions affecting seamen's health.

As a first instalment to meet temporary housing needs, the Secretary of State for Scotland has allocated some 33,000 houses to Scottish local authorities. A circular issued by the Department of Health for Scotland states that first deliveries of the temporary houses will be made to areas where the housing shortage is greatest and most urgent. Each local authority is advised in the circular how many houses the Secretary of State is prepared to allocate to it meantime. In the first instance demand will exceed supply, and consideration will be given later for a further allocation when additional bungalows become available.

Letters, Notes, and Answers

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 2111. TELEGRAMS: *Aitiology Westcent, London*. ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

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ANY QUESTIONS?

Penicillin Solutions

Q.—*It has been my experience that glucose and glucose-saline solutions become distinctly acid on autoclaving, attaining a pH of approximately 4. I believe that reference to this fact has been made in the medical press, and the acidity has been shown to have no injurious effect on the patient. I hesitate, however, to carry out the addition of penicillin preparations to glucose or glucose-saline solutions, as recommended in the M.R.C. War Memorandum No. 12, in view of the inactivation of penicillin by acids. I should be grateful for your comments on this matter.*

A.—This is an important point. Penicillin does deteriorate in an acid medium, and although *p*H 5.0 is usually given as the lower limit of its stability, even this mild degree of acidity is probably better avoided. The causes of the development of an acid reaction in autoclaved glucose-saline are imperfectly understood; prolonged storage after autoclaving is one factor. It is, of course, possible to sterilize glucose solutions by filtration, but the best way out of this difficulty so far as penicillin administration is concerned is to use normal saline without glucose as the vehicle. This is in fact now the usual practice. The present tendency is to administer the daily systemic dose in a smaller volume—with the Edinburgh "eudrop" apparatus, for instance, it is contained in only 100 c.cm.—and since the only object of using glucose-saline rather than normal saline is to avoid an excessive dose of salt, this is no longer a material consideration.

Consultants' Fees

Q.—*Is it the duty of the general practitioner who calls in a consultant to collect the fees for consultation and operation? What is his legal responsibility and commitment in the event of the patient's not paying the fees?*

A.—The custom of the profession in this country is that the general practitioner advises on the amount of the consultant's fee, but neither collects it as agent for the consultant nor guarantees its payment by the patient. As he should have no financial interest in the contract between the patient and the specialist, it is obviously better that the patient should pay directly. The specialist could only fix the G.P. with liability as a guarantor if he could bring to court a written guarantee signed by the practitioner, for a contract of guarantee is one of those which must be evidenced in writing.

Saccharin

Q.—*Is continued use of saccharin harmful? What is its sweetening power? Being derived from tar, does it induce cancer? One authority states that it causes dyspepsia. Is it then to be contra-indicated in peptic ulcer? Has it an antipyretic action?*

A.—Saccharin is a substance chemically not unrelated to sulphanilamide and also to aspirin (acetylsalicylic acid). On general grounds it might therefore be expected to be of the same order of toxicity as these substances. Since tablets of saccharin contain only 0.5 grain (30 mg.), each being equivalent in sweetness to one lump of sugar, it is evident that the ordinary use of saccharin is not going to lead to toxic effects, for no reasonable person would suggest that either sulphanilamide or aspirin cannot be used regularly with safety in 1/2-gr. doses. The actual toxic dose for animals is 4 g. per kg., equivalent to half a pound weight of saccharin for a man. Apart from these considerations, saccharin has been used by diabetics with regularity for many years without ill effects, and in actual experiment men have taken, for example, 520 g. in 9 days, and 5 g. a day for 5 months, without ill effect.

Its sweetening power is a property possessed by many benzol derivatives. It certainly does not induce cancer, for no substance with a structure so simple has yet been found to do so. The statement that it causes dyspepsia was examined by Herter and Folin in

America for the Referee Board of the Council of Pharmacy and Chemistry of the American Medical Association. They found that large doses (0.75 to 1.5 g., or 12 to 20 gr., daily) occasionally produced hyperacidity and increased intestinal putrefaction. There were no such effects with small doses. It can, therefore, be safely used in ordinary amounts by patients with peptic ulcer. An antipyretic action is not described, but in large dose—e.g., 10 gr. (20 tablets)—it might well have one, judging by its composition.

Hepatic Cirrhosis

Q.—*Is there any treatment available along new lines for hepatic cirrhosis, such as are envisaged in your annotation of Sept. 9 (p. 346)? Dietary considerations in this case can, I believe, be solved in accordance with that annotation, but tell me which preparation "containing all the members of the vitamin B complex carefully balanced" is recommended? Is methionine available for clinical use?*

A.—The analogy between cirrhosis of the liver in man and hepatic injury from dietary deficiencies in animals can be overstrained, and there is little evidence that cirrhosis in man is specifically improved by vitamins or food principles. The improvement is not greater than might be expected from good nutrition in any chronic disease. Yeast is probably the best-balanced source of the vitamin B complex, and it is possible to give as much as 3 oz. a day in the form of bakers' yeast, dried yeast, or food yeast. Unfortunately the total vitamin content is not very high. In any event no convincing results have been seen in a controlled therapeutic trial of yeast in hepatic cirrhosis (unpublished observations). More concentrated proprietary preparations of the B complex are available in the form of wheat germ, autolysed yeast, or extracts of rice polishings. Liver extract is also a very good source. Alternatively, the separate elements in the complex—aneurin, riboflavin, and nicotinic acid—may be given simultaneously in high dosage, but this means omitting elements of the B complex such as folic acid, and is likely to be extraordinarily costly. No report of any controlled trial of methionine in cirrhosis is available, but it is known that it has not had any noteworthy success in large-scale trials in infective hepatitis. A recent fine chemical manufacturer's catalogue quoted methionine at 7s. a gramme. The therapeutic dose is of the order of 5 g., or 35s. a day. There is reason to believe that stocks are not sufficient for clinical trial apart from officially sponsored research, nor are they likely to become available during the war in view of the high cost of production of methionine and the scant evidence of therapeutic effects in man.

Nephrotic Syndrome in Childhood

Q.—*Has the work of Farr et al. in America on casein hydrolysate in the treatment of the nephrotic syndrome in children proved of any use in nephrotic crises, and if so, where could I get a suitable preparation?*

A.—Farr believed that injections of casein hydrolysate were of special value in the treatment of infectious episodes in the nephrotic syndrome in childhood, but no confirmation of his work has been published. A theoretical disadvantage of protein hydrolysates in the treatment of hypoproteinaemia of renal origin is the fact that, if the material is given parenterally, large quantities of water and mineral salts are given at the same time. The final concentration of hydrolysate administered is usually 5% or less, so that 1,000 c.cm. of fluid must be given to inject 50 g. of protein. Amounts of this order would need to be given for many days, and in practice this difficulty seems greatly to have limited the application of parenteral treatment to children with oedema. Oral therapy is often difficult owing to loss of appetite or nausea. More hope is therefore being placed in the possibility of using purified serum albumin for injection in these cases, but this is still a project for the future. Several research groups are at present co-operating with British manufacturers on the preparation and use of protein hydrolysates, but the technique is still in the experimental stage, and there are apparently no preparations on the open market in this country.

Oxalated Blood for Cell Counts

Q.—*Is the practice of sending blood (oxalated) by post for estimation of Hb, cell count, etc., likely to give true results? It is presumed that the sample reaches the laboratory within about 15 hours after withdrawal from a vein.*

A.—While oxalated blood is adequate for rough haemoglobin estimations and red cell counts, an accurate complete blood count cannot be carried out by this method, and it should be discouraged.

B.M.R. Estimations and Thiouracil

Q.—*Are B.M.R. estimations essential in treating a patient with thiouracil provided a watch is kept on the white cell count?*

A.—No. B.M.R. estimations are certainly useful, but in experienced hands they are not necessary. The general condition of the patient, his nervous state and autonomic function, his pulse rate, temperature chart, and skin temperature, are all important indications of progress. Probably the most important sign is his weight. It has been reported that the blood cholesterol (the absolute value of which is too variable to be useful) is valuable in a relative way, and that in any individual patient changes in blood cholesterol run parallel to changes in B.M.R. This statement has not been fully corroborated, but appears often to be true.

Treatment of Rodent Ulcer

Q.—*What is the best line of treatment for a somewhat doubtful rodent ulcer, apart from excision?*

A.—Provided that there are reasonable grounds for the diagnosis of rodent ulcer and that the situation is appropriate, intensive radiotherapy is called for, which can be carried out only by an expert. It is often desirable to remove a small portion for microscopical examination before the treatment is carried out.

Disturbed Sleep in a Child

Q.—*Could you advise me on the treatment or causation of disturbed sleep in a boy of 3? After three to four hours' sleep the child begins rocking in the "knee-elbow" position, eventually waking up after the bedclothes have been thrown off. If laid on his side he quietens for a quarter to half an hour, and then begins again. So far no treatment has been of any avail.*

A.—Should there be any doubt of the child's intelligence not being normal, mental testing even at this age can be done by an educational psychologist at a child guidance clinic. In children of normal intellect in the first three years rhythmic movements in the state between sleep and wakefulness are common. The first essential is to reassure the parents that such movements, though annoying, are of no importance and will disappear. To hasten their departure and help to break the habit, a sedative for two or three weeks to provide deeper sleep is the only form of treatment necessary. For a child of 3 years luminal gr. 1/4, or, if well tolerated, even gr. 1/2, at bedtime is usually effective.

LETTERS, NOTES, ETC.

Mental Hospitals

Dr. OTHO FITZGERALD (Shenley Hospital, Herts) writes: It surprised me when reading the *Journal* of Oct. 28 to note the title or reference of "Asylum Doctors' Pay" applied to the letter which was signed "A.M.O." Apparently your attention has not been drawn to Section 20 of the 1930 Mental Treatment Act, which rules that the term "asylum" should be replaced by the term "mental hospital." I am sure you will admit the wisdom of that ruling, since institutions catering for the mentally disordered are no longer merely places of rest and detention but provide active and specific forms of treatment. "A.M.O." pleads that "niggardly remuneration is not likely to increase the repute of a branch of medicine which in the past has not enjoyed the prestige it deserves." It is surely very unkind of you, Sir, further to lash poor "A.M.O.'s" injured sense of prestige by insinuating that he is employed in institutions which are worthy only to be designated "asylums."

Flea Bites

Dr. THOMAS FENTEM (Bushey, Herts) writes: I have read the note under the above heading (Oct. 14, p. 520). Unfortunately I am one of those who appear to attract fleas, and it may be of some comfort to others similarly attractive to think that may be one reason why others are immune. However, I found years ago that if I took a 5-grain tablet of sulphur, at first daily and then at longer intervals, the flea, though he might irritate by running about, would not bite. A few drops of chloroform, a sort of depth charge, in the neighbourhood of his walk but on the outside of the clothes, sufficed to put him out.

Arsenic in Malaria: Correction

Prof. D. B. BLACKLOCK writes: By an oversight on my part a phrase of some importance was omitted from the typescript of my letter published in your issue of Nov. 18. The fourth paragraph should read: "This evidence, so far as it goes, is against the probability of organic arsenic alone, in the form of neokharsivan *and in the dosage suggested*, proving curative. . . ." The phrase which was omitted is in italics.

Pure-tone Audiometer: Correction

Dr. MARY D. SHERIDAN writes: May I correct an inaccuracy in my article of Aug. 26, to which my attentoin has recently been drawn? The first pure-tone audiometer in this country was used by Dr. A. W. G. Ewing at Manchester University in 1927. Dr. Ewing's original paper on "High-frequency Deafness" was read before the Physical Society in London in 1930. His book *Aphasia in Children*, describing still earlier researches in this subject, was also published in 1930.